

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	20104	(GaN or gallium near8 nitride)	US-PGPUB; USPAT
2	BRS	L2	71	(GaN or gallium near8 nitride) with membrane	US-PGPUB; USPAT
3	BRS	L3	153	(GaN or gallium near8 nitride) same membrane	US-PGPUB; USPAT
4	BRS	L4	9	(GaN or gallium near8 nitride) same membrane same (pump or micropump)	US-PGPUB; USPAT
5	BRS	L5	127	(GaN or gallium near8 nitride) same (pump or micropump)	US-PGPUB; USPAT

	Document ID	Kind Codes	Source	Issue Date	Pages
1	US 20060054927 A1		US- PGPUB	20060316	13
2	US 20050167172 A1		US- PGPUB	20050804	24
3	US 20050016853 A1		US- PGPUB	20050127	21
4	US 20030206806 A1		US- PGPUB	20031106	35
5	US 20020071785 A1		US- PGPUB	20020613	7
6	US 20020067992 A1		US- PGPUB	20020606	10
7	US 20020066319 A1		US- PGPUB	20020606	7
8	US 6647796 B2		USPAT	20031118	6
9	US 6579068 B2		USPAT	20030617	10

	Title
1	Sensor using a GaN transistor
2	Telematic method and apparatus with integrated power source
3	Bridges for electroosmotic flow systems
4	Bridges, elements and junctions for electroosmotic flow systems
5	Integrated micropump analysis chip and method of making the same
6	Method of manufacture of a suspended nitride membrane and a microperistaltic pump using the same
7	Semiconductor nitride pressure microsensor and method of making and using the same
8	Semiconductor nitride pressure microsensor and method of making and using the same
9	Method of manufacture of a suspended nitride membrane and a microperistaltic pump using the same

	Abstract	Current OR
1		257/194
2		180/65.8
3		204/600
4		417/48
5		422/82.05
6		417/53
7		73/754
8		73/754
9		417/53

Connecting via Winsock to STN

Welcome to STN International! Enter x:x

LOGINID:ssspta1743bxs

PASSWORD:

TERMINAL (ENTER 1, 2, 3, OR ?):2

* * * * * Welcome to STN International * * * * *

NEWS	1		Web Page URLs for STN Seminar Schedule - N. America
NEWS	2		"Ask CAS" for self-help around the clock
NEWS	3	JAN 17	Pre-1988 INPI data added to MARPAT
NEWS	4	FEB 21	STN AnaVist, Version 1.1, lets you share your STN AnaVist visualization results
NEWS	5	FEB 22	The IPC thesaurus added to additional patent databases on STN
NEWS	6	FEB 22	Updates in EPFULL; IPC 8 enhancements added
NEWS	7	FEB 27	New STN AnaVist pricing effective March 1, 2006
NEWS	8	MAR 03	Updates in PATDPA; addition of IPC 8 data without attributes
NEWS	9	MAR 22	EMBASE is now updated on a daily basis
NEWS	10	APR 03	New IPC 8 fields and IPC thesaurus added to PATDPAFULL
NEWS	11	APR 03	Bibliographic data updates resume; new IPC 8 fields and IPC thesaurus added in PCTFULL
NEWS	12	APR 04	STN AnaVist \$500 visualization usage credit offered
NEWS	13	APR 12	LINSPEC, learning database for INSPEC, reloaded and enhanced
NEWS	14	APR 12	Improved structure highlighting in FQHIT and QHIT display in MARPAT
NEWS	15	APR 12	Derwent World Patents Index to be reloaded and enhanced during second quarter; strategies may be affected
NEWS	16	MAY 10	CA/CAPLUS enhanced with 1900-1906 U.S. patent records
NEWS	17	MAY 11	KOREAPAT updates resume
NEWS	18	MAY 19	Derwent World Patents Index to be reloaded and enhanced
NEWS	19	MAY 30	IPC 8 Rolled-up Core codes added to CA/CAPLUS and USPATFULL/USPAT2
NEWS	20	MAY 30	The F-Term thesaurus is now available in CA/CAPLUS
NEWS	21	JUN 02	The first reclassification of IPC codes now complete in INPADOC
NEWS EXPRESS			FEBRUARY 15 CURRENT VERSION FOR WINDOWS IS V8.01a, CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP), AND CURRENT DISCOVER FILE IS DATED 19 DECEMBER 2005. V8.0 AND V8.01 USERS CAN OBTAIN THE UPGRADE TO V8.01a AT http://download.cas.org/express/v8.0-Discover/
NEWS HOURS			STN Operating Hours Plus Help Desk Availability
NEWS LOGIN			Welcome Banner and News Items
NEWS IPC8			For general information regarding STN implementation of IPC 8
NEWS X25			X.25 communication option no longer available after June 2006

Enter NEWS followed by the item number or name to see news on that specific topic.

All use of STN is subject to the provisions of the STN Customer agreement. Please note that this agreement limits use to scientific research. Use for software development or design or implementation of commercial gateways or other similar uses is prohibited and may

result in loss of user privileges and other penalties.

* * * * * STN Columbus * * * * *

FILE 'HOME' ENTERED AT 16:31:54 ON 07 JUN 2006

=> file caplus compendex inspec

COST IN U.S. DOLLARS

SINCE FILE

TOTAL

ENTRY

SESSION

FULL ESTIMATED COST

0.21

0.21

FILE 'CAPLUS' ENTERED AT 16:32:11 ON 07 JUN 2006

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)

FILE 'COMPENDEX' ENTERED AT 16:32:11 ON 07 JUN 2006

Compendex Compilation and Indexing (C) 2006

Elsevier Engineering Information Inc (EEI). All rights reserved.

Compendex (R) is a registered Trademark of Elsevier Engineering Information Inc.

FILE 'INSPEC' ENTERED AT 16:32:11 ON 07 JUN 2006

Compiled and produced by the IET in association WITH FIZ KARLSRUHE

COPYRIGHT 2006 (c) THE INSTITUTION OF ENGINEERING AND TECHNOLOGY (IET)

=> s (GaN or gallium (8w) nitride)

L1 72598 (GAN OR GALLIUM (8W) NITRIDE)

=> s l1 (s) membrane

L2 124 L1 (S) MEMBRANE

=> s l1 (s) membrane (s) (pump or micropump)

L3 0 L1 (S) MEMBRANE (S) (PUMP OR MICROPUMP)

=> s l1 (p) membrane (p) (pump or micropump)

PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH

FIELD CODE - 'AND' OPERATOR ASSUMED 'L2 (P) MEMBRANE'

PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH

FIELD CODE - 'AND' OPERATOR ASSUMED 'MEMBRANE (P) '

PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH

FIELD CODE - 'AND' OPERATOR ASSUMED 'L3 (P) MEMBRANE'

PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH

FIELD CODE - 'AND' OPERATOR ASSUMED 'MEMBRANE (P) '

L4 1 L1 (P) MEMBRANE (P) (PUMP OR MICROPUMP)

=> display l4 1 ibib abs

L4 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:361194 CAPLUS

DOCUMENT NUMBER: 135:36385

TITLE: Measurement of atmospheric formaldehyde with a
diffusion scrubber and light-emitting
diode-liquid-core waveguide based fluorometry

AUTHOR(S): Li, Jianzhong; Dasgupta, Purnendu K.; Zhang, Genfa;
Hutterli, Manuel A.

CORPORATE SOURCE: Department of Chemistry, Texas Tech University,
Lubbock, TX, 79409, USA

SOURCE: Field Analytical Chemistry and Technology (2001),
5(1-2), 2-12

CODEN: FACTFR; ISSN: 1086-900X

PUBLISHER: John Wiley & Sons, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB An automated instrument for near real-time measurement of atmospheric formaldehyde (HCHO) is described. The chemical involves the cyclization reaction of HCHO with 1,3-cyclohexanedione (CHD) in the presence of NH₄⁺ ions to form a fluorescent dihydropyridine derivative. A GaN-based light-emitting diode (LED), emitting in the near UV, was used as the excitation source in a miniature flow-through fluorescence detector based on a transversely illuminated liquid-core waveguide. The instrument is configured to operate in a periodic auto-zero mode where sampling **pump** exhaust is chemical treated to provide zero gas for automated periodic checks of the baseline. The liquid-phase portion of the system provides a signal:noise ratio = 3 and limit of detection (LOD) of 10 nM aqueous HCHO. A thermostated, Nafion-~~membrane~~-based diffusion scrubber collects atmospheric HCHO in pure water with an absorption efficiency

of .apprx.70%, resulting in an LOD of 30 pptv HCHO. Where the H₂O₂:HCHO ratio is very high, as in background polar atmospheres, LOD will deteriorate markedly. Design, performance details, and illustrative results from a 1999 field campaign (Atlanta Supersite Study) are presented. Interference from H₂O₂ is discussed.

REFERENCE COUNT: 52 THERE ARE 52 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> s electrodeformable (s) membrane

L5 0 ELECTRODEFORMABLE (S) MEMBRANE

=> s l1 (8w) membrane

L6 77 L1 (8W) MEMBRANE

=> s l1 (8w) (pump or micropump)

L7 156 L1 (8W) (PUMP OR MICROPUMP)

=> s l1 (6w) (pump or micropump)

L8 119 L1 (6W) (PUMP OR MICROPUMP)

=> s l1 (6w) membrane

L9 71 L1 (6W) MEMBRANE

=> s l1 (6w) membrane (6w) (pump or micropump)

L10 0 L1 (6W) MEMBRANE (6W) (PUMP OR MICROPUMP)

=> s l1 (8w) membrane (8w) (pump or micropump)

L11 0 L1 (8W) MEMBRANE (8W) (PUMP OR MICROPUMP)

=> display l2 1-124 ibib abs

L2 ANSWER 1 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:438626 CAPLUS

TITLE: GaN-based stacked micro-optics system

AUTHOR(S): Hou, Chia-Hung; Chen, Chii-Chang; Pong, Bao-Jen; Li, Ming-Hung; Chi, Guo-Chung; Chen, Nai-Chuan; Shih, Chuan-Feng; Chang, Pen-Hsiu

CORPORATE SOURCE: Institute of Optical Sciences, National Central University, 320 Jung-Li, Taiwan

SOURCE: Applied Optics (2006), 45(11), 2396-2398

CODEN: APOPAI; ISSN: 0003-6935

PUBLISHER: Optical Society of America

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A prototype of a GaN-based stacked micro-optics system is demonstrated. The system consists of a GaN microlens, GaN

membrane gratings, six spacers, a spatial filter, and a 980 nm VCSEL. The laser beam is collimated by the **GaN** microlens and diffracted by the **GaN membrane** grating. The systems can be used in blue-violet-UV micro-optics systems.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 2 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:345940 CAPLUS

TITLE: Optical properties of **GaN** photonic crystal **membrane** nanocavities at blue wavelengths

AUTHOR(S): Choi, Yong Seok; Meier, Cedrik; Sharma, Rajat; Hennessy, Kevin; Haberer, Elaine D.; Nakamura, Shuji; Hu, Evelyn L.

CORPORATE SOURCE: Departments of Electrical and Computer Engineering, University of California, Santa Barbara, CA, 93106, USA

SOURCE: Materials Research Society Symposium Proceedings (2006), 892(GaN, AlN, InN and Related Materials), 491-496

CODEN: MRSPDH; ISSN: 0272-9172

PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The design parameters were studied for high-Q photonic-crystal (PC) bandgap modes in the emission wavelengths of InGaN/GaN multiple quantum wells. Exptl. schemes are demonstrated to realize 2D triangular-lattice PC membrane structures, which is essential to obtain photonic bandgap (PBG) modes, and the optical properties of L7 membrane nanocavities that consist of 7 missing holes in the Γ -K direction. L7 cavities show pronounced resonances with Q factors of 300-800 in the PBG as well as the enhancement of light extraction of the broad InGaN/GaN multiple-quantum-well emission by the 2D PBG.

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 3 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:293685 CAPLUS

TITLE: Fabrication of **GaN** nanotubular material using MOCVD with aluminum oxide **membrane**

AUTHOR(S): Jung, Woo-Gwang; Jung, Se-Hyuck; Kung, Patrick; Razeghi, Manijeh

CORPORATE SOURCE: School of Advanced Materials Engineering, Kookmin Univ., Seongbuk-gu, Seoul, 136-702, S. Korea

SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2006), 6127(Quantum Sensing and Nanophotonic Devices III), 61270K/1-61270K/8
CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB **GaN** nanotubular material is fabricated with aluminum oxide **membrane** in MOCVD. SEM, XRD, TEM and PL are employed to characterize the fabricated **GaN** nanotubular material. An aluminum oxide membrane with ordered nano holes is used as template. Gallium nitride is deposited at the inner wall of the nano holes in aluminum oxide template, and the nanotubular material with high aspect ratio is synthesized using the precursors of TMG and ammonia gas. Optimal synthesis condition in MOCVD is obtained successfully for the gallium nitride nanotubular material in this research. The diameter of **GaN** nanotube fabricated is approx. 200 .apprx. 250 nm and the wall thickness is about 40 .apprx. 50 nm. **GaN** nanotubular material consists of numerous fine **GaN** particulates

with sizes ranging 15 to 30 nm. The composition of gallium nitride is confirmed to be stoichiometrically 1:1 for Ga and N by EDS. XRD and TEM analyses indicate that grains in GaN nanotubular material have nano-crystalline structure. No blue shift is found in the PL spectrum on the GaN nanotubular material fabricated in aluminum oxide template.

REFERENCE COUNT: 45 THERE ARE 45 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 4 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:200751 CAPLUS

TITLE: Fabrication of **GaN** nanotubular material

using MOCVD with an aluminium oxide **membrane**

AUTHOR(S): Jung, Woo-Gwang; Jung, Se-Hyuck; Kung, Patrick; Razeghi, Manijeh

CORPORATE SOURCE: School of Advanced Materials Engineering, Kookmin University, 861-1 Chongnung-dong, Songbuk-gu, Seoul, 136-702, S. Korea

SOURCE: Nanotechnology (2006), 17(1), 54-59

CODEN: NNOTER; ISSN: 0957-4484

PUBLISHER: Institute of Physics Publishing

DOCUMENT TYPE: Journal

LANGUAGE: English

AB **GaN** nanotubular material is fabricated with an aluminum oxide **membrane** in MOCVD. SEM, XRD, TEM and PL are employed to characterize the fabricated GaN nanotubular material. An aluminum oxide membrane with ordered nanoholes is used as a template. Gallium nitride is deposited at the inner wall of the nanoholes in the aluminum oxide template, and the nanotubular material with high aspect ratio is synthesized using the precursors of TMG and ammonia gas. Optimal synthesis conditions in MOCVD are obtained successfully for the gallium nitride nanotubular material in this research. The diameter of the GaN nanotube fabricated is approx. 200-250 nm and the wall thickness is about 40-50 nm. GaN nanotubular material consists of numerous fine GaN particulates with size range 15-30 nm. The composition of gallium nitride is confirmed to be stoichiometrically 1:1 for Ga and N by EDS. XRD and TEM analyses indicate that the grains in GaN nanotubular material have a nano-crystalline structure. No blue shift is found in the PL spectrum on the GaN nanotubular material fabricated in an aluminum oxide template.

REFERENCE COUNT: 45 THERE ARE 45 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 5 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:174493 CAPLUS

DOCUMENT NUMBER: 144:400643

TITLE: Visible resonant modes in **GaN**-based photonic crystal **membrane** cavities

AUTHOR(S): Meier, Cedrik; Hennessy, Kevin; Haberer, Elaine D.; Sharma, Rajat; Choi, Yong-Seok; McGroddy, Kelly; Keller, Stacia; DenBaars, Steven P.; Nakamura, Shuji; Hu, Evelyn L.

CORPORATE SOURCE: Departments of Materials and Electrical & Computer Engineering, University of California-Santa Barbara, Santa Barbara, CA, 93106, USA

SOURCE: Applied Physics Letters (2006), 88(3), 031111/1-031111/3

CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Photonic crystal membrane cavities play a key role as building blocks in the realization of several applications, including quantum information and photonic circuits. Thus far, there was no work on defect cavities with

active layers emitting in the UV to green range of the spectrum based on the (Al,In,Ga)N material system. While this material system has great potential for a new generation of optoelectronic devices, there are several obstacles for the fabrication of **GaN**-based **membrane** cavities, including the absence of a conventional selective chemical wet etch. Here, the authors demonstrate the 1st fabrication of fully undercut **GaN** photonic crystal **membranes** containing an InGaN multiquantum well layer, fabricated using band-gap-selective photoelectrochem. etching. A postfabrication coating of Ta2O5 is used to tune the cavity modes into resonance with the quantum well emission, and the fabricated membranes exhibit resonant modes with $Q = 300$.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 6 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:131465 CAPLUS

DOCUMENT NUMBER: 144:283556

TITLE: Method for in improving surface quality of **gallium nitride** crystal **membrane** generated by hydrogenide epitaxial method

INVENTOR(S): Yu, Guanghui; Lei, Benliang; Ye, Haohua; Qi, Ming; Li, Aizhen

PATENT ASSIGNEE(S): Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 7 pp. CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1588624	A	20050302	CN 2004-10053350	20040730
PRIORITY APPLN. INFO.:			CN 2004-10053350	20040730

AB This invention pertains to method for improving surface quality of **gallium nitride** crystal **membrane** generated by hydrogenide epitaxial method and the method comprises leading-in In supplementary source while hydrogenide vapor epitaxial generating **GaN**, and reaching to surface of substrate with generated InCl and GaCl gas, reacting with NH3 at 1000-1100°.

L2 ANSWER 7 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:10196 CAPLUS

DOCUMENT NUMBER: 144:71852

TITLE: Hydrogen separation membrane and its use in hydrogen purification apparatus

INVENTOR(S): Sato, Tadao

PATENT ASSIGNEE(S): Nippon Telegraph and Telephone Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp. CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2006000698	A2	20060105	JP 2004-176847	20040615

AB The **membrane** with good H gas permselectivity contains AlN microparticles and has p-type semiconductors (e.g., Mg-doped GaN, AlGaN, InGaN) on at least one side. In the apparatus, H is passed through the membrane by using the pressure difference between on side and the other side of the membrane for purification. The high-purity H gas is obtained at low cost in wide temperature region when compared with a conventional Pd alloy membrane method.

L2 ANSWER 8 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1351537 CAPLUS

DOCUMENT NUMBER: 144:201700

TITLE: GaN blue photonic crystal **membrane** nanocavities

AUTHOR(S): Choi, Y.-S.; Hennessy, K.; Sharma, R.; Haberer, E.; Gao, Y.; DenBaars, S. P.; Nakamura, S.; Hu, E. L.; Meier, C.

CORPORATE SOURCE: Department of Electrical and Computer Engineering and Materials Department, University of California, Santa Barbara, CA, 93106, USA

SOURCE: Applied Physics Letters (2005), 87(24), 243101/1-243101/3

CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB GaN-based photonic-crystal **membrane** nanocavities with Q factors up to 800 were realized at the wavelength of .apprx.480 nm. The tuning behavior agrees well with numerical calcns. using the finite-difference time-domain method. Theor., the lowest energy mode of a cavity that consists of seven missing holes in the Γ -K direction promises a Q factor $\leq 4 + 104$ with a mode volume of .apprx.1.3+ $(\lambda/n)^3$.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 9 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1229751 CAPLUS

DOCUMENT NUMBER: 144:402012

TITLE: Piezoelectric polarization-induced two dimensional electron gases in AlGaN/GaN heteroepitaxial structures: Application for micro-pressure sensors

AUTHOR(S): Chu, S. N. G.; Ren, F.; Pearton, S. J.; Kang, B. S.; Kim, S.; Gila, B. P.; Abernathy, C. R.; Chyi, J.-I.; Johnson, W. J.; Lin, J.

CORPORATE SOURCE: Multiplex Inc., South Plainfield, NJ, 07080, USA

SOURCE: Materials Science & Engineering, A: Structural Materials: Properties, Microstructure and Processing (2005), A409(1-2), 340-347

CODEN: MSAPE3; ISSN: 0921-5093

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The wurtzite Group-III nitrides exhibit piezoelec. polarization along their c-axis. Differential piezoelec. and spontaneous polarizations in strained AlGaN/GaN heterostructure grown on [0 0 0 1] sapphire substrates induce two-dimensional electron gas (2DEG) at the AlGaN/GaN hetero-interface. By using a simple two-terminal device in a bending configuration, we demonstrate a linear dependence of the 2DEG channel conductance with applied bending strain. A detailed anal. of the elastic strain distribution in the multilayer structure indicates that the applied strain dependence of the conductance is directly proportional to the

electron mobility of 2DEG. Thus, the bending test provides a new technique for measuring the electron mobility in this structure. For a mesa-structure device with a partially relaxed applied strain in the top AlGa_N layer, the theory further predicts a reversal in the applied strain dependence of the channel conductance for strain relaxation greater than 15% and this prediction is confirmed by the experiment. Finally, the feasibility of fabricating a micro-pressure sensor using a 150 μm diameter thin flexible AlGa_N/Ga_N circular **membrane** with an interdigitated-fingers device on a (1 1 1) Si substrate is demonstrated. The measured pressure sensitivity is 0.07 mS/bar.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 10 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:779576 CAPLUS

DOCUMENT NUMBER: 144:323469

TITLE: Arrays of vertically aligned and hexagonally arranged ZnO nanowires. A new template-directed approach
AUTHOR(S): Fan, Hong Jin; Lee, Woo; Scholz, Roland; Dadgar, Armin; Krost, Alois; Nielsch, Kornelius; Zacharias, Margit

CORPORATE SOURCE: Max Planck Institute of Microstructure Physics, Halle, 06120, Germany

SOURCE: Nanotechnology (2005), 16(6), 913-917
CODEN: NNOTER; ISSN: 0957-4484

PUBLISHER: Institute of Physics Publishing

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A new template-directed method for large-scale fabrication of hexagonally patterned and vertically aligned ZnO nanowires is demonstrated. The process involves a novel type of metal membrane, Au catalyst templates produced using the membrane as the deposition mask, and catalyst-guided vapor-phase growth of ZnO nanowires. The metal membranes, composed of hexagonal nanotube arrays, are electrochem. replicated from ordered porous Al₂O₃. The obtained ZnO nanowires are uniformly aligned perpendicular to the Ga_N surface and have a distribution according to the pattern defined by the nanotube **membrane**. By modifying the electrochem. parameters and growth conditions, the diameter of the nanowires can be varied in the range 30-110 nm.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 11 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:617133 CAPLUS

DOCUMENT NUMBER: 143:296806

TITLE: Capacitance pressure sensor based on Ga_N high-electron-mobility transistor-on-Si **membrane**

AUTHOR(S): Kang, B. S.; Kim, J.; Jang, S.; Ren, F.; Johnson, J. W.; Therrien, R. J.; Rajagopal, P.; Roberts, J. C.; Piner, E. L.; Linthicum, K. J.; Chu, S. N. G.; Baik, K.; Gila, B. P.; Abernathy, C. R.; Pearton, S. J.

CORPORATE SOURCE: Department of Chemical Engineering, University of Florida, Gainesville, FL, 32611, USA

SOURCE: Applied Physics Letters (2005), 86(25), 253502/1-253502/3

CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The changes in the capacitance of the channel of an AlGa_N/Ga_N high-electron-mobility transistor (HEMT) **membrane** structure

fabricated on a Si substrate were measured during the application of both tensile and compressive strain through changes in the ambient pressure. The capacitance of the channel displays a change of $7.19 \pm 0.45 + 10^{-3}$ pF/ μ m as a function of the radius of the membrane at a fixed pressure of +9.5 bar and exhibits a linear characteristic response between -0.5 and +1 bar with a sensitivity of 0.86 pF/bar for a 600 μ m radius membrane. The hysteresis was 0.4% in the linear range. These AlGaN/GaN HEMT **membrane**-based sensors appear to be promising for both room-temperature and elevated-temperature pressure-sensing applications.

REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 12 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:499537 CAPLUS

DOCUMENT NUMBER: 143:163935

TITLE: Hexagonal-arranged ZnO nanowire arrays by using Au nanohole membranes as fabrication template

AUTHOR(S): Fan, H. J.; Lee, W.; Nielsch, K.; Zacharias, M.; Dadgar, A.; Krost, A.

CORPORATE SOURCE: Max Planck Institute of Microstructure Physics, Halle, 06120, Germany

SOURCE: Materials Research Society Symposium Proceedings (2005), Volume Date 2004, 849(Kinetics-Driven Nanopatterning on Surfaces), 47-52
CODEN: MRSPDH; ISSN: 0272-9172

PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A new template method for large-scale fabrication of hexagonally patterned and vertically aligned ZnO nanowires is demonstrated. The process involves a novel type of metal membrane, a gold catalyst template produced using the membrane as deposition mask, and the catalyst-guided growth of ZnO nanowires. The metal membranes, composed of hexagonal nanohole arrays, are electrochem. replicated from ordered porous alumina. The ZnO nanowires obtained have a uniform alignment perpendicular to the GaN surface and a distribution according to the pattern defined by the nanohole **membrane**. Such periodically arranged ZnO nanowires have potential applications as sensor arrays and piezoelec. transducers.

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 13 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:312072 CAPLUS

DOCUMENT NUMBER: 142:492796

TITLE: Anion selective potentiometric sensor based on **gallium nitride** crystalline **membrane**

AUTHOR(S): Alifragis, Yiannis; Konstantinidis, Giorgos; Georgakilas, Alexander; Chaniotakis, Nikos

CORPORATE SOURCE: Laboratory of Analytical Chemistry, Department of Chemistry, University of Crete, Crete, 71409, Greece

SOURCE: Electroanalysis (2005), 17(5-6), 527-531
CODEN: ELANEU; ISSN: 1040-0397

PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Ga nitride (GaN) (0001) grown on sapphire was used as a sensor element for the development of a potentiometric sensor. The GaN-based ion-selective electrode has pH sensitivity which originates from the direct interaction of the Ga with the hydroxide ions. At the same time the sensor shows very good selectivity towards the very hydrophilic anion of orthophosphate,

over the very lipophilic ClO₄⁻. Potentiometry and impedance spectroscopy suggest that the observed potentiometric sensitivity originates from the direct interaction of anions in solution with the acidic Ga(III) on the surface of the GaN (0001) crystal. This is also supported by the fact that the Ga atoms are electron deficient due to the induced polarity of the Ga to the N bond, enhancing the electrostatic interaction between the Lewis basic anions. The semiconductor properties of the GaN allow for its application as an all solid-state semiconductor-based anion potentiometric sensor, or alternatively as the transducer in composite cation sensitive potentiometric sensors. The latter was demonstrated with the deposition of a K selective liquid polymeric **membrane** on top of the GaN surface.

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 14 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:238548 CAPLUS

DOCUMENT NUMBER: 142:294256

TITLE: Use of HIV Tat peptides complexed with semiconductor nanocrystals for enhancing transport across cell membranes and their use in high throughput drug screening assays

INVENTOR(S): Bruchez, Marcel P.; Daniels, R. Hugh; Dias, Jennifer; Mattheakis, Larry C.; Liu, Hongjian; Burt, Aquanette M.; Christoffer, Berndt; Ly, Danith H.

PATENT ASSIGNEE(S): Quantum Dot Corporation, USA

SOURCE: U.S. Pat. Appl. Publ., 60 pp., Cont.-in-part of U.S. Ser. No. 972,744.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005059031	A1	20050317	US 2003-735608	20031212
US 2002155507	A1	20021024	US 2001-972744	20011005
US 2004023261	A1	20040205	US 2003-374652	20030226
WO 2005081721	A2	20050909	WO 2004-US41045	20041206
WO 2005081721	A3	20060316		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: US 2000-238677P P 20001006
US 2001-312558P P 20010815
US 2001-972744 A2 20011005
US 2003-735608 A 20031212

AB The present invention relates to use of HIV Tat peptides complexed with semiconductor nanocrystals for enhancing transport across cell membranes and their use in high throughput drug screening assays. The methods are particularly useful in multiplex settings where a plurality of encoded cells are to be assayed. Kits comprising reagents for performing such methods are also provided.

L2 ANSWER 15 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:955318 CAPLUS
DOCUMENT NUMBER: 142:186170
TITLE: Gallium nitride based LED and fabrication method
INVENTOR(S): Hwang, Hyeon Sang; Kim, Hyeon Su; Park, Seong Ju
PATENT ASSIGNEE(S): Kwangju Institute of Science and Technology, S. Korea
SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp. given
CODEN: KRXXA7
DOCUMENT TYPE: Patent
LANGUAGE: Korean
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
KR 2002084710	A	20021111	KR 2001-23653	20010502
PRIORITY APPLN. INFO.:			KR 2001-23653	20010502

AB A GaN-based LED (light emitting diode) and a fabrication method are provided to distribute uniformly current by changing the structure of an electrode without using a transparent electrode. An LED is formed by laminating sequentially a buffer layer, an n-type **GaN membrane**, a light emitting layer, a p-type **GaN membrane**, a p-type or an n-type electrode on a surface of a sapphire substrate. The buffer layer is used for heterogeneous junction for growing a GaN semiconductor on the surface of the sapphire substrate. The n-type and the p-type **membranes** can be formed by AlGaN or InGaN as well as **GaN**. The n-type **GaN membrane** has the first fingers and the second fingers. The first fingers are connected to each other. The second fingers are connected to each other. The second fingers are located at a place lower than the place of the first fingers.

L2 ANSWER 16 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:900309 CAPLUS
DOCUMENT NUMBER: 142:13406
TITLE: Gratings in **GaN membranes**
AUTHOR(S): Chen, Chii-Chang; Hou, Chia-Hung; Sheu, Jinn-Kong; Chang, Jenq-Yang; Li, Ming-Hung; Chi, Gou-Chung; Wu, Chuck
CORPORATE SOURCE: Institute of Optical Sciences, National Central University, Jung-Li, 320, Taiwan
SOURCE: Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes & Review Papers (2004), 43(8B), 5854-5856
CODEN: JAPNDE
PUBLISHER: Japan Society of Applied Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB In this work, gratings are fabricated on the GaN thin film grown on the silicon substrates. **GaN membranes** are obtained by removing the silicon below the **GaN** gratings. The samples are stacked on the GaN diffractive microlenses on sapphire substrates fabricated using gray-level masks. The stacked components are characterized using a He-Ne laser. The laser beam is collimated by the GaN microlenses and diffracted by the GaN gratings. The result demonstrates a stacked microoptics systems in GaN-based materials for the first time.

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 17 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:899983 CAPLUS
 DOCUMENT NUMBER: 143:143721
 TITLE: Nano-dot addition effect on the electrical properties of Ni contacts to p-type GaN
 AUTHOR(S): Sohn, Jung Inn; Song, June-O.; Leem, Dong-Seok; Lee, Seonghoon; Seong, Tae-Yeon
 CORPORATE SOURCE: Department of Materials Science and Engineering, Kwangju Institute of Science and Technology, Kwangju, 500-712, S. Korea
 SOURCE: Physica Status Solidi C: Conferences and Critical Reviews (2004), 1(10), 2524-2527
 CODEN: PSSCGL; ISSN: 1610-1634
 PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 AB The correlations between the elec. behaviors of Ni contacts on p-GaN and the insertion of metal nano-dots at the Ni/GaN interfaces have been investigated. The Pt, Au, and Ti nano-dots directly deposited on p-GaN using the anodic porous alumina **membrane** mask by electron beam evaporation. It is shown that the samples with the inserted nano-dots exhibit better elec. behaviors compared with those without the nano-dots. The improvement of the elec. behaviors is explained in terms of the difference of the Schottky barrier heights between the Ni film and the metal nano-dots, and the enhanced elec. field at the Ni/GaN interfaces due to the presence of the nano-dots. Based on exptl. and theor. results, the possible mechanisms for the improved elec. behavior is discussed.
 REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 18 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:899959 CAPLUS
 DOCUMENT NUMBER: 143:67872
 TITLE: Cleaved laser facets on free-standing InGa_N LD membrane created by laser lift-off and structural characterization of the membrane
 AUTHOR(S): Li, Zilan; Hu, Xiaodong; Qin, Zhixin; Yu, Tongjun; Nie, Ruijuan; Lu, Min; Ren, Qian; Zhang, Bei; Yang, Zhijian; Chen, Weihua; Chen, Zhizhong; Yang, Hua; Zhang, Guoyi
 CORPORATE SOURCE: State Key Laboratory for Artificial Microstructure and Mesoscopic Physics, Department of Physics, Peking University, Beijing, 100871, Peop. Rep. China
 SOURCE: Physica Status Solidi C: Conferences and Critical Reviews (2004), 1(10), 2425-2428
 CODEN: PSSCGL; ISSN: 1610-1634
 PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 AB Cleaved laser facets on free-standing InGa_N laser diode membrane created by laser lift-off were fabricated and studied. Cleaved laser facets on Ga_N on sapphire were compared with those on free-standing laser **membrane**. Atomic force microscopy and SEM results show that the cleaved laser facets on free-standing laser membrane are much smoother than those on sapphire. TEM images show that no significant crystal quality degradation was introduced during the laser lift-off process.
 REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 19 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:888223 CAPLUS
 DOCUMENT NUMBER: 143:67602
 TITLE: Photoluminescence from InGa_N/Ga_N MQWs on

sapphire and **membranes** fabricated by laser lift-off

AUTHOR(S): Yu, Tongjun; Li, Zilan; Qin, Z. X.; Chen, Z. Z.; Yang, Z. J.; Hu, X. D.; Zhang, G. Y.

CORPORATE SOURCE: State Key Laboratory of Artificial Microstructure and Microscopic Physics, School of Physics, Peking University, Beijing, 100871, Peop. Rep. China

SOURCE: Physica Status Solidi B: Basic Research (2004), 241(12), 2783-2786
CODEN: PSSBBD; ISSN: 0370-1972

PUBLISHER: Wiley-VCH Verlag GmbH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Photoluminescence and Raman scattering spectra of InGaN/GaN MQWs on sapphire and **membranes** free of substrate fabricated by laser lift-off were studied. Photoluminescence peak of 850° annealed sample red shifts from that of as grown sample, while in the case of membrane samples, the luminescence peak blue-shifts when annealed at 700°. In Raman scattering spectra, InGaN/GaN MQWs film without sapphire substrate has a lower E2 mode frequency (569.3 cm⁻¹) than that of the films with substrate (570.8 cm⁻¹), which indicates that compressive stress in the films releases partially when the sapphire substrate is taken off. It is believed that the piezoelec. field decrease leads to the blue-shift in luminescence spectra. Compared with the samples with sapphire substrate, the free-standing membranes showed blue-shift of luminescence peak after relatively low temperature annealing, because the piezoelec. field reduced more easily in the films without substrate.

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 20 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:864484 CAPLUS

DOCUMENT NUMBER: 142:46413

TITLE: Pressure-induced changes in the conductivity of AlGaIn/GaN high-electron mobility-transistor **membranes**

AUTHOR(S): Kang, B. S.; Kim, S.; Ren, F.; Johnson, J. W.; Therrien, R. J.; Rajagopal, P.; Roberts, J. C.; Piner, E. L.; Linthicum, K. J.; Chu, S. N. G.; Baik, K.; Gila, B. P.; Abernathy, C. R.; Pearton, S. J.

CORPORATE SOURCE: Department of Chemical Engineering, University of Florida, Gainesville, FL, 32611, USA

SOURCE: Applied Physics Letters (2004), 85(14), 2962-2964
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB AlGaIn/GaN high-electron-mobility transistors (HEMTs) show a strong dependence of source/drain current on the piezoelec.-polarization-induced two-dimensional electron gas. The spontaneous and piezoelec.-polarization-induced surface and interface charges can be used to develop very sensitive but robust sensors for the detection of pressure changes. The changes in the conductance of the channel of a AlGaIn/GaN high electron mobility transistor (HEMT) **membrane** structure fabricated on a Si substrate were measured during the application of both tensile and compressive strain through changes in the ambient pressure. The conductivity of the channel shows a linear change of $\sim 6.4 \times 10^{-2}$ mS/bar for application of compressive (tensile) strain. The AlGaIn/GaN HEMT **membrane**-based sensors appear to be promising for pressure sensing applications.

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 21 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:620473 CAPLUS

DOCUMENT NUMBER: 141:285446

TITLE: Removal of thick (>100 nm) InGaN layers for optical devices using band-gap-selective photoelectrochemical etching

AUTHOR(S): Haberer, E. D.; Sharma, R.; Stonas, A. R.; Nakamura, S.; DenBaars, S. P.; Hu, E. L.

CORPORATE SOURCE: Materials Department and Department of Electrical and Computer Engineering, University of California, Santa Barbara, CA, 93106, USA

SOURCE: Applied Physics Letters (2004), 85(5), 762-764
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We report on band-gap-selective photoelectrochem. (PEC) etching of thick InGaN layers for use in optical devices, such as GaN microdisks, distributed Bragg reflectors, and two-dimensional photonic crystal membranes. Three InGaN sacrificial layer structures are studied: a 300 nm InGaN layer, an InGaN/GaN superlattice, and an InGaN/InGaN superlattice. Calculated equilibrium band diagrams of the epitaxial structures are used to explain the observed etching behavior. The strong piezoelec.-induced fields within the InGaN sacrificial layers are found to greatly affect carrier confinement and etching behavior. As a demonstration of the etching technique, a free-standing GaN microdisk on an InGaN post is fabricated.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 22 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:394548 CAPLUS

DOCUMENT NUMBER: 142:327210

TITLE: Development of gallium nitride-based MEMS structures

AUTHOR(S): Stonas, Andreas R.; Turner, Kimberly L.; DenBaars, Steven P.; Hu, Evelyn L.

CORPORATE SOURCE: Department of Electrical and Computer Engineering, University of California at Santa Barbara, Santa Barbara, CA, 93106, USA

SOURCE: Transducers '03, International Conference on Solid-State Sensors, Actuators and Microsystems, Digest of Technical Papers, 12th, Boston, MA, United States, June 8-12, 2003 (2003), Volume 2, 1156-1159. Institute of Electrical and Electronics Engineers: New York, N. Y.

CODEN: 69FHV2; ISBN: 0-7803-7731-1

DOCUMENT TYPE: Conference

LANGUAGE: English

AB The fabrication of MEMS structures has generally depended on the ability to carry out highly selective, deep lateral and vertical etching of the component materials. This is particularly problematic in gallium nitride (GaN) and the associated AlGaN and InGaN materials, which are all noted for their chemical inertness. The authors report here a method for producing MEMS in this material system based on backside-illuminated photoelectrochem. (BIPEC) undercut wet etching. The authors also discuss resonance spectra of structures fabricated by this method, including cantilevers and membranes.

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 23 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:167343 CAPLUS

DOCUMENT NUMBER: 141:147819

TITLE: Light-emitting diode with optical reflecting membrane

INVENTOR(S): Zeng, Jianxin; Guo, Zhengda; Cai, Wenzhong; Zhuang, Huiwen; Ye, Tingbi; Zhang, Liangzhao; Chen, Xinru
PATENT ASSIGNEE(S): Lianwei Leijing Science and Technology Co., Ltd.,
Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 8 pp.
CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1372328	A	20021002	CN 2001-104233	20010226
PRIORITY APPLN. INFO.:			CN 2001-104233	20010226

AB The title light-emitting diode (LED) consists of substrate, first semiconductor on the first surface of light-transmission substrate, active layer on the first semiconductor, the second semiconductor on the active layer, and optical reflecting membrane on the second semiconductor. The light-transmission substrate is made up of one or more of quartz, glass, Al₂O₃, GaN, SiC, ZnSe, GaP and AlN. The first semiconductor comprises n-type semiconductor film, and the second semiconductor comprises p-type semiconductor film. The optical reflecting membrane may be single-layer structure or multi-layer structure. The optical reflecting membrane comprises at least one or more of Au, Ag, Cu, Fe, Sn, Al, Be, Cr, Ge, Pd, Ni, Ti, Zn and theirs oxides.

L2 ANSWER 24 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:56954 CAPLUS

DOCUMENT NUMBER: 141:197041

TITLE: Characterization of GaN based Schottky UV detectors in the vacuum UV (VUV) and the soft X-ray (SX) region (10-100 nm)

AUTHOR(S): Motogaito, Atsushi; Watanabe, Hironobu; Hiramatsu, Kazumasa; Fukui, Kazutoshi; Hamamura, Yutaka; Tadatomo, Kazuyuki

CORPORATE SOURCE: Department of Electrical and Electronic Engineering, Mie University, Tsu, Mie, 514-8507, Japan

SOURCE: Physica Status Solidi C: Conferences and Critical Reviews (2003), 0(7), 147-150
CODEN: PSSCGL; ISSN: 1610-1634

PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Responsivity spectra of GaN based Schottky type UV photodetectors with transparent electrode from the Vacuum UV (VUV) region to soft x-ray (SX) region (10-100 nm, 124-12.4 eV) are described for the 1st time. The calculated transmittance of 10 nm-thick transparent Ni/Au electrode from the transmittance of Ti/Au membrane is .apprx.0.5-0.7 in the VUV and SX region (10-100 eV). Thus probably the 10-nm-transparent Ni/Au electrode is thin enough to transmit VUV and SX light into the transparent electrode. The value of responsivity in the SX region (at 13 nm) is .apprx.0.05 A/W.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 25 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:1010368 CAPLUS

DOCUMENT NUMBER: 140:398277

TITLE: Method for producing GaN series blue LED ohmic electrode
 INVENTOR(S): Jang, Yi-Tsung; Chen, Lung-Jian; Jian, Feng-Ren
 PATENT ASSIGNEE(S): Formosa Epitaxy Incorporation, Taiwan
 SOURCE: Taiwan., 4 pp.
 CODEN: TWXXA5
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
TW 471033	B	20020101	TW 2000-89106850	20000413
PRIORITY APPLN. INFO.:			TW 2000-89106850	20000413

AB The present invention relates to a method for producing a GaN series blue LED ohmic electrode and a transparent conductive layer (TCL), and a structure thereof. The method comprises: forming an alloy **membrane** on a P-type GaN; sep. forming an alloy **membrane** ohmic electrode on a P-type GaN epitaxial layer and an N-type GaN epitaxial layer; applying a thermal treatment to the alloy **membrane** and the alloy **membrane** ohmic electrode to form an optimum ohmic performance and optical transmittance. Therefore, the injected current can effectively and uniformly distribute to the N-type electrode.

L2 ANSWER 26 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN
 ACCESSION NUMBER: 2003:952832 CAPLUS
 DOCUMENT NUMBER: 141:19813
 TITLE: AlxGal-xN-A new material system for biosensors
 AUTHOR(S): Steinhoff, Georg; Purrucker, Oliver; Tanaka, Motomu; Stutzmann, Martin; Eickhoff, Martin
 CORPORATE SOURCE: Walter Schottky Institute, Technical University Munich, Garching, D-85748, Germany
 SOURCE: Advanced Functional Materials (2003), 13(11), 841-846
 CODEN: AFMDC6; ISSN: 1616-301X
 PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The applicability of the group III nitride material system for the fabrication of semiconductor-based biosensors is demonstrated. The operation of ion-sensitive field-effect transistors (ISFETs) based on AlGaIn/GaN heterostructures in aqueous electrolytes is shown to be characterized by high sensitivity and low drift. Fibroblasts in contact with oxidized and as-deposited AlGaIn surfaces are demonstrated to survive at least for 24 h, indicating that these surfaces are chemical robust and non-toxic against living cells. Surface hydrophilization using thermal oxidation allows the deposition of highly mobile lipid membranes by vesicle fusion. The homogeneity and the diffusion properties of phospholipids with different net charges were analyzed by fluorescence microscopy and constant photobleaching, taking advantage of the optical transparency of the AlGaIn material system. The obtained results reveal that AlGaIn-based devices are promising candidates for future multifunctional biosensors.

REFERENCE COUNT: 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 27 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN
 ACCESSION NUMBER: 2003:933537 CAPLUS
 DOCUMENT NUMBER: 140:366181
 TITLE: Structure of assemblies of metal nanowires in mesoporous alumina membranes studied by EXAFS, XANES, x-ray diffraction, and SAXS

AUTHOR(S): Benfield, Robert E.; Grandjean, Didier; Dore, John C.;
Esfahanian, Hamid; Wu, Zhonghua; Kroell, Michael;
Geerkens, Marcus; Schmid, Guenter
CORPORATE SOURCE: Functional Materials Group, School of Physical
Sciences, University of Kent, Canterbury, CT2 7NR, UK
SOURCE: Faraday Discussions (2003), Volume Date 2004, 125,
327-342
CODEN: FDISE6; ISSN: 1359-6640
PUBLISHER: Royal Society of Chemistry
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Mesoporous alumina membranes ("anodic aluminum oxide", or "AAO") are made by anodic oxidation of aluminum metal. These membranes contain hexagonal arrays of parallel non-intersecting cylindrical pores perpendicular to the membrane surface. By varying the anodization voltage, the pore diams. are controllable within the range 5-250 nm. The authors have used AAO membranes as templates for the electrochem. deposition of metals within the pores to produce nanowires. These represent assemblies of one-dimensional quantum wires with prospective applications in electronic, optoelectronic, and magnetic devices. Detailed characterization of the structures of these nanowire assemblies on a variety of length scales is essential to understand their phys. properties and evaluate their possible applications. The authors have used EXAFS, XANES, WAXS, high energy x-ray diffraction, and SAXS to study their structure and bonding. In this paper, the authors report the results of their studies of four different nanowire systems supported in AAO membranes. These are the ferromagnetic metals iron and cobalt, the superconducting metal tin, and the semiconductor gallium nitride. Iron nanowires in pores of diameter over the range 12 nm-72 nm are structurally very similar to body centered cubic bulk iron. They have a strong preferred orientation within the alumina pores. Their XANES shows significant differences from that of bulk iron, showing that the electronic structure of the iron nanowires depends systematically on their diameter. Cobalt nanowires are composed of a mixture of hcp. and face centered cubic phases, but the ratio of the two phases does not depend in a simple way on the pore diameter or preparation conditions. In bulk cobalt, the face centered cubic β -phase is normally stable only at high temps. Strong preferred orientation of the c-axis in the pores was found. Tin nanowires in alumina membranes with pore diams. between 12 nm and 72 nm have a tetragonal β -structure at ambient temperature and also at 80 K. Magnetic susceptibility measurements show that they are diamagnetic, and become superconducting at the same temperature as bulk tin (3.7 K). Gallium nitride nanowires have been prepared in alumina membranes with pore diameter 24 nm by a novel method. Gallium nitrate was deposited in the pores from aqueous solution and thermolyzed at 1000° to form Ga₂O₃, which was reacted with ammonia at 1000°. The GaN nanowires have the wurtzite structure. Preparation at 1150° led to the incorporation of aluminum in the GaN. The mesoscopic ordering of the pores in the AAO membranes and their filling by metal nanowires has been studied by SAXS, which shows patterns of Bragg peaks arising from the pore arrays. Addnl., the cobalt nanowires have been the subject of an initial ASAXS study.

REFERENCE COUNT: 72 THERE ARE 72 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 28 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:653627 CAPLUS

DOCUMENT NUMBER: 139:188085

TITLE: Semiconductor multilayer membranes, semiconductor

laser devices and manufacture
INVENTOR(S): Futagawa, Noriyuki; Kuramoto, Hiroshi; Sasaoka, Chiaki
PATENT ASSIGNEE(S): NEC Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003234546	A2	20030822	JP 2002-31557	20020207
JP 3753077	B2	20060308		

PRIORITY APPLN. INFO.: JP 2002-31557 20020207

AB The devices comprise: a sapphire substrate; an n-GaN buffer layer; an n-GaN contact layer having an n shoulder electrode; an n-AlGaIn cladding, an n-GaN guide, a GaInN MQW, a p-AlGaIn cap, a p-GaN guide, an alumina mask, a p-AlGaIn cladding, a p-GaN contact and a Ni/Au electrode.

L2 ANSWER 29 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:532063 CAPLUS

DOCUMENT NUMBER: 139:77461

TITLE: Field emitter device comprising carbon nanotube having protective membrane

INVENTOR(S): Jeong, Tae-Won; Yoo, Ji-Beom; Yi, Whi-Kun; Lee, Jeong-Hee; Yu, Se-Gi; Lee, Chang-Soo; Heo, Jung-Na

PATENT ASSIGNEE(S): Samsung Electronics Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003127960	A1	20030710	US 2003-337858	20030108
US 6903500	B2	20050607		
KR 2003060611	A	20030716	KR 2002-1383	20020110
EP 1328001	A1	20030716	EP 2003-250152	20030110
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
JP 2003217516	A2	20030731	JP 2003-3998	20030110

PRIORITY APPLN. INFO.: KR 2002-1383 A 20020110

AB The present invention relates to a field emitter device, and more particularly, to a field emitter device comprising carbon nanotubes. A field emitter device including C nanotubes each of which has a protective membrane is provided. The protective membrane is formed of a nitride, a carbide, or an oxide. Suitable nitrides for the protective membrane include B nitride, Al nitride, B C nitride, and Ga nitride. The protective membrane protects the C nanotubes from damage due to arcing or an unnecessary remaining gas and thus improves field emission characteristics and stability of the field emitter device.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 30 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:488940 CAPLUS

DOCUMENT NUMBER: 139:60141

TITLE: Nitride semiconductor laser devices and manufacture

INVENTOR(S): Nakajima, Hiroshi; Yamaguchi, Yasushi; Yanashima,

AB The manufacturing process comprises the steps of: (1) forming a resist on a GaN-type semiconductor laminate; and (2) forming a dielec. layer on the area without the resist by immersing the laminate in a supersatd. solution of the dielec. compound

L2 ANSWER 33 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:203086 CAPLUS

DOCUMENT NUMBER: 138:228982

TITLE: Multilayered reflective **membrane** and **gallium nitride**-based light-emitting element

INVENTOR(S): Yanamoto, Tomoya

PATENT ASSIGNEE(S): Nichia Corp., Japan

SOURCE: U.S. Pat. Appl. Publ., 20 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003047744	A1	20030313	US 2002-189767	20020708
US 6822272	B2	20041123		
JP 2003101141	A2	20030404	JP 2002-198772	20020708
PRIORITY APPLN. INFO.:			JP 2001-207680	A 20010907

AB A multilayered reflective **membrane** is described comprising an (Al,Ga)N layer having a thickness of $(\alpha_1\lambda)/(4n_1)$ (λ = incident light wavelength, n_1 = a reflectivity) and a **GaN** layer having a thickness of $(\alpha_2\lambda)/(4n_2)$ (n_2 : a reflectivity) which are deposited alternately and satisfy the relation of $0 < \alpha_1 < 1$ and $\alpha_1 + \alpha_2 = 2$. A **GaN**-based light emitting element is also described comprising a multilayered reflective **membrane** formed on a substrate, the multilayered reflective **membrane** being deposited on at least one side of an active layer through a nitride semiconductor layer, wherein the multilayered reflective **membrane** comprises an (Al,Ga)N layer having a thickness = $(\alpha_1\lambda)/(4n_1)$ and a **GaN** layer having a thickness = $(\alpha_2\lambda)/(4n_2)$ which are deposited alternately. Use of the reflective film in semiconductor lasers is shown.

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 34 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:152711 CAPLUS

DOCUMENT NUMBER: 138:195646

TITLE: Growth method of semiconductor crystal membranes for electroluminescent color displays

INVENTOR(S): Koketsu, Akinori; Kawaguchi, Norihito; Masaki, Miyuki

PATENT ASSIGNEE(S): Ishikawajima-Harima Heavy Industries Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003060237	A2	20030228	JP 2002-93706	20020329
PRIORITY APPLN. INFO.:			JP 2001-171865	A 20010607

AB The invention refers to a growth method of semiconductor crystal membranes

for electroluminescent devices, wherein a substrate is placed in a reaction chamber containing precursors of In, Ga and N, and heated 400 - 650°. A high power pulsed laser is used to form InGaN and red green and blue luminescent components are formed by MOCVD or MOMBE.

L2 ANSWER 35 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:147703 CAPLUS

DOCUMENT NUMBER: 138:376034

TITLE: Microcavity light emitting diodes based on **GaN membranes** grown by molecular beam epitaxy on silicon

AUTHOR(S): Duboz, Jean-Yves; Briere de l'Isle, Nadia; Dua, Lydie; Legagneux, Pierre; Mosca, Mauro; Reverchon, Jean-Luc; Damilano, Benjamin; Grandjean, Nicolas; Semond, Fabrice; Massies, Jean; Dudek, Richard; Poitras, Daniel; Cassidy, Tom

CORPORATE SOURCE: Thales Research and Technology, Domaine de de Corbeville, Orsay, 91404, Fr.

SOURCE: Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes & Review Papers (2003), 42(1), 118-121

CODEN: JAPNDE

PUBLISHER: Japan Society of Applied Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Resonant-cavity InGaN/GaN quantum well light emitting diodes were fabricated. Nitride layers were grown by MBE on Si (111). The authors fabricated the structures using a combination of Si substrate etching, GaN etching and dielec. (Ta2O5/SiO2) mirror deposition. The electroluminescence spectra show that the emission within the distributed Bragg reflector stop band is enhanced in the membrane microcavity. The cavity modes are broadened by some cavity length nonuniformity that is introduced when the GaN is back etched to adjust the cavity length. This process does not need any transfer on an intermediate host substrate and is fully compatible with large area semiconductor processing.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 36 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:904947 CAPLUS

DOCUMENT NUMBER: 137:377307

TITLE: Nitride semiconductor LED devices

INVENTOR(S): Tatsumi, Masatake; Hata, Toshio; Fudeta, Mayuko

PATENT ASSIGNEE(S): Sharp Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
JP 2002344020	A2	20021129	JP 2001-144083	20010515
JP 3772098	B2	20060510		
US 2005051788	A1	20050310	US 2002-146412	20020514

PRIORITY APPLN. INFO.: JP 2001-144083 A 20010515

AB The devices comprise: a 1st and a 2nd metal electrode; the 2nd metal ohmic electrode; and an n-GaN substrate, an n-GaN contact, an n-GaInN crash preventive, an n-AlGaIn cladding, an n-GaN guide, a GaInN MQW active, a p-GaN guide, a p-AlGaIn cladding, a p-GaN contact and a p electrode layer, where the LED is mounted on a frame work on a AuSn solder and is covered

with an epoxy resin.

L2 ANSWER 37 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:557171 CAPLUS

DOCUMENT NUMBER: 137:254779

TITLE: Morphology and Raman scattering spectrum of GaN nanowires embedded in nanochannels of template

AUTHOR(S): Zhang, Jun; Zhang, Lide

CORPORATE SOURCE: Department of Physics, Yantai University, Yantai, 264005, Peop. Rep. China

SOURCE: Journal of Physics D: Applied Physics (2002), 35(13), 1481-1485

CODEN: JPAPBE; ISSN: 0022-3727

PUBLISHER: Institute of Physics Publishing

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The hexagonal wurtzite **GaN** nanowires embedded in the nanochannels of anodic alumina **membrane** were achieved by the direct reaction of Ga vapor with a constant flowing ammonia atmospheric X-ray diffraction (XRD), SEM and transmission electron microscopy were used to measure the size and structures of the samples. The Raman scattering spectrum of ordered GaN nanowires was studied. The Raman spectrum of the GaN nanowire arrays is consistent with the hexagonal wurtzite structure GaN, in agreement with XRD observation. The E2(high), E1(TO), and A1(TO) phonon frequencies at 563, 553, and 529 cm⁻¹ show the low-energy shifts, resp. The shifts and band broadening of the Raman modes result from the nanosize effect.

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 38 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:319774 CAPLUS

DOCUMENT NUMBER: 137:100965

TITLE: CW InGaN multiple-quantum-well laser diodes on copper and diamond substrates by laser lift-off

AUTHOR(S): Kneissl, Michael; Wong, William S.; Treat, David W.; Teepe, Mark; Miyashita, Naoko; Johnson, Noble M.

CORPORATE SOURCE: Electronic Materials Laboratory, XEROX Palo Alto Research Center, Palo Alto, CA, 94304, USA

SOURCE: Materials Science & Engineering, B: Solid-State Materials for Advanced Technology (2002), B93(1-3), 68-72

CODEN: MSBTEK; ISSN: 0921-5107

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Continuous-wave (cw) InGaN multiple-quantum-well laser diodes grown on sapphire substrates by metalorg. CVD were successfully transferred onto Cu and diamond using excimer laser lift-off. Room-temperature continuous-wave threshold currents ≥ 87 mA with threshold voltages of 5.8 V were obtained for laser diodes on diamond substrates. GaN-based laser structures transferred onto Cu substrates show a significantly reduced thermal resistance resulting in a $>2\times$ increase in continuous-wave output power of >100 mW. High-quality cleaved facet were obtained for free-standing **GaN** laser **membranes** after sapphire substrate removal.

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 39 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:299817 CAPLUS

DOCUMENT NUMBER: 136:391336

TITLE: Materials in nanoporous alumina
AUTHOR(S): Schmid, Guenter
CORPORATE SOURCE: Institut fuer Anorganische Chemie, University of
Essen, Germany
SOURCE: Journal of Materials Chemistry (2002), 12(5),
1231-1238
CODEN: JMACEP; ISSN: 0959-9428
PUBLISHER: Royal Society of Chemistry
DOCUMENT TYPE: Journal; General Review
LANGUAGE: English

AB A review. Nanoporous alumina membranes are easily available by controlled anodization of aluminum surfaces in aqueous acids. Their properties, such as optical transparency, temperature stability, and pores of variable widths and lengths, make them a unique material to be filled by optically or magnetically interesting elements and compds. on the nanoscale. Magnetic nanowires of Fe, Co, and Ni are formed by AC deposition from aqueous solns. Gold colloids were generated inside the pores by growing smaller particles or by preprepared particles. Siloxanes, GaN, and CdS were made inside the pores from appropriate precursors resulting in photoluminescent alumina membranes.

REFERENCE COUNT: 50 THERE ARE 50 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 40 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:933463 CAPLUS
DOCUMENT NUMBER: 136:142093
TITLE: CW InGaN multiple-quantum-well laser diodes on copper
substrates
AUTHOR(S): Kneissl, M.; Wong, W. S.; Treat, D. W.; Teepe, M.;
Miyashita, N.; Johnson, N. M.
CORPORATE SOURCE: Electronic Materials Laboratory, XEROX Palo Alto
Research Center, Palo Alto, CA, 94304, USA
SOURCE: Physica Status Solidi A: Applied Research (2001),
188(1), 23-29
CODEN: PSSABA; ISSN: 0031-8965
PUBLISHER: Wiley-VCH Verlag Berlin GmbH
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Continuous-wave (cw) InGaN multiple-quantum-well laser diodes grown on sapphire substrates by metalorg. CVD (MOCVD) were successfully transferred onto Cu using an excimer laser lift-off technique. For the laser diodes on Cu substrates improved device performance was observed with room-temperature continuous-wave threshold currents ≥ 68 mA and threshold voltages of 5.9 V. Differential quantum efficiencies of 0.7 W/A were obtained with a laser emission wavelength near 400 nm. GaN-based laser structures transferred onto Cu substrates show a significantly reduced thermal resistance resulting in a >2-fold increase in continuous-wave output power to >100 W. High quality cleaved facets were obtained for free-standing GaN laser membranes after sapphire substrate removal.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 41 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:796794 CAPLUS
DOCUMENT NUMBER: 135:325104
TITLE: Gallium nitride type semiconductor LED devices
INVENTOR(S): Yamaji, Taihei; Takahashi, Norio
PATENT ASSIGNEE(S): Seiwa Electric Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001308380	A2	20011102	JP 2000-118135	20000419
JP 3505643	B2	20040308		
JP 2003179263	A2	20030627	JP 2002-327385	20000419

PRIORITY APPLN. INFO.: JP 2000-118135 A3 20000419

AB The devices comprise: a sapphire substrate; an n-AlN buffer layer; an n-GaN cladding/contact layer having an n shoulder electrode; and a GaN/GaInN MQW active, a p-GaN cladding, a p-AlGaIn cap, a p-GaN contact and a p electrode layer.

L2 ANSWER 42 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:701227 CAPLUS
DOCUMENT NUMBER: 136:12163
TITLE: Fabrication and photoluminescence of ordered GaN nanowire arrays
AUTHOR(S): Zhang, J.; Zhang, L. D.; Wang, X. F.; Liang, C. H.; Peng, X. S.; Wang, Y. W.
CORPORATE SOURCE: Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, 230031, Peop. Rep. China
SOURCE: Journal of Chemical Physics (2001), 115(13), 5714-5717
CODEN: JCPSA6; ISSN: 0021-9606
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Large-scale of crystalline GaN nanowires (diameter .apprx.50 nm) were fabricated through CVD in the nanochannels of the anodic alumina template. X-ray diffraction and selected area electron diffraction pattern studies indicate that the nanowires are single crystal with hexagonal wurtzite structure. A typical SEM image and the energy dispersive x-ray spectroscopy results indicate that In nanoparticles only act as catalyst in GaN nanowires growth. At room temperature, luminescence of the GaN nanowire arrays shows a visible broadband with 3 peaks, which are located at .apprx.363, 442, and 544 nm. The light emission may be attributed to GaN band-edge emission, the existence of defects or surface states, and the interaction between the ordered GaN nanowires and anodic alumina **membrane**. The growth mechanism of crystalline GaN nanowires is discussed. The method makes it possible to synthesize other nitride nanowire arrays.

REFERENCE COUNT: 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 43 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:688534 CAPLUS
DOCUMENT NUMBER: 136:13377
TITLE: Micro-Raman investigation of GaN nanowires prepared by direct reaction Ga with NH3
AUTHOR(S): Zhang, J.; Peng, X. S.; Wang, X. F.; Wang, Y. W.; Zhang, L. D.
CORPORATE SOURCE: Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, 230031, Peop. Rep. China
SOURCE: Chemical Physics Letters (2001), 345(5,6), 372-376
CODEN: CHPLBC; ISSN: 0009-2614
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Ordered crystalline GaN nanowires embedded in the nanochannels of anodic alumina **membrane** (AAM) were achieved by direct reaction

Ga with NH₃. The impact of reaction temps. on Raman spectroscopic properties of GaN nanowires was studied. X-ray diffraction and TEM observations demonstrate that the crystalline GaN nanowires have hexagonal wurtzite structure. The hexagonal wurtzite structure GaN nanowires prepared at 960° are .apprx.40 nm in diameter and up to several hundreds of micrometers in length.

REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 44 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:321067 CAPLUS

DOCUMENT NUMBER: 133:94910

TITLE: Highly ordered nanostructures of single crystalline GaN nanowires in anodic alumina membranes

AUTHOR(S): Cheng, G. S.; Chen, S. H.; Zhu, X. G.; Mao, Y. Q.; Zhang, L. D.

CORPORATE SOURCE: Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, Peop. Rep. China

SOURCE: Materials Science & Engineering, A: Structural Materials: Properties, Microstructure and Processing (2000), A286(1), 165-168
CODEN: MSAPE3; ISSN: 0921-5093

PUBLISHER: Elsevier Science S.A.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Synthesis of highly ordered nanostructures of single crystalline GaN nanowires in anodic Al₂O₃ membranes was achieved through a gas reaction of Ga₂O vapor with a constant NH₃ atmospheric at 1000° in the presence of nanosized metallic In catalysis. Atomic force microscopy, x-ray diffraction, Raman backscattering spectrum, SEM, and transmission electron microscopy indicate that the ordered nanostructure consists of the single crystalline hexagonal wurtzite GaN nanowires with ≈20 nm in diameter and 40-50 μm in length in the uniform nanochannels of the anodic Al₂O₃ membrane. The vapor-liquid-solid (VLS) growth mechanism of the ordered nanostructure was discussed in detail.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 45 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:643474 CAPLUS

DOCUMENT NUMBER: 132:43324

TITLE: Large-scale synthesis of single crystalline gallium nitride nanowires

AUTHOR(S): Cheng, G. S.; Zhang, L. D.; Zhu, Y.; Fei, G. T.; Li, L.; Mo, C. M.; Mao, Y. Q.

CORPORATE SOURCE: Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, 230031, Peop. Rep. China

SOURCE: Applied Physics Letters (1999), 75(16), 2455-2457
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Large-scale synthesis of single crystalline GaN nanowires in anodic alumina membrane was achieved through a gas reaction of Ga₂O vapor in a constant flowing ammonia atmospheric at 1273 K. X-ray diffraction, Raman backscattering spectroscopy, SEM, and transmission electron microscopy indicated that those GaN nanowires with hexagonal wurtzite structure were about 14 nm in diameter and up to several hundreds of micrometers in length. The growth mechanism of the single crystalline GaN nanowires is discussed.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS

L2 ANSWER 46 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:554673 CAPLUS
 DOCUMENT NUMBER: 131:275509
 TITLE: Synthesis of orderly nanostructure of crystalline GaN nanoparticles on anodic porous alumina membrane
 AUTHOR(S): Cheng, G. S.; Zhang, L. D.; Zhu, X. G.; Chen, S. H.; Li, Y.; Zhu, Y.; Fei, G. T.
 CORPORATE SOURCE: Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, 230031, Peop. Rep. China
 SOURCE: Nanostructured Materials (1999), 11(3), 421-426
 CODEN: NMAEE7; ISSN: 0965-9773
 PUBLISHER: Elsevier Science Inc.
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Synthesis of an orderly nanostructure of crystalline GaN nanoparticles on anodic porous alumina membrane through a gas reaction of Ga₂O vapor with a constant ammonia atmospheric at 900°C was achieved. The investigation using atomic force microscopy, x-ray diffraction, transmission electron microscopy and high resolution electron microscopy indicated that the orderly nanostructure consisted of polycryst. GaN nanoparticles with a hexagonal wurtzite structure and about 10-20 nm in diameter. The growth mechanism of the orderly nanostructure of the GaN nanoparticles was discussed. The photoluminescence spectrum of the orderly nanostructure was also reported.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 47 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:549612 CAPLUS
 DOCUMENT NUMBER: 131:264506
 TITLE: Fabrication of thin-film InGaN light-emitting diode membranes by laser lift-off
 AUTHOR(S): Wong, W. S.; Sands, T.; Cheung, N. W.; Kneissl, M.; Bour, D. P.; Mei, P.; Romano, L. T.; Johnson, N. M.
 CORPORATE SOURCE: Department of Materials Science and Mineral Engineering, University of California, Berkeley, CA, 94720-1760, USA
 SOURCE: Applied Physics Letters (1999), 75(10), 1360-1362
 CODEN: APPLAB; ISSN: 0003-6951
 PUBLISHER: American Institute of Physics
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Indium-Ga nitride (InGaN) multiple-quantum-well (MQW) light-emitting diode (LED) membranes, prefabricated on sapphire growth substrates, were created using pulsed-excimer laser processing. The thin-film InGaN MQW LED structures, grown on sapphire substrates, were 1st bonded onto a Si support substrate with an Et cyanoacrylate-based adhesive. A single 600 mJ/cm², 38 ns KrF (248 nm) excimer laser pulse was directed through the transparent sapphire, followed by a low-temperature heat treatment to remove the substrate. Free-standing InGaN LED membranes were then fabricated by immersing the InGaN LED/adhesive/Si structure in acetone to release the device from the supporting Si substrate. The current-voltage characteristics and room-temperature emission spectrum of the LEDs before and after laser lift-off were unchanged.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 48 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:531890 CAPLUS
 DOCUMENT NUMBER: 131:221594
 TITLE: GaN and related compounds for MEMS and MOEMS
 AUTHOR(S): Krawczyk, Stanislas K.; Someya, Takao; Arakawa, Yasuhiko; Fujita, Hiroyuki
 CORPORATE SOURCE: Inst. Ind. Sci., Univ. Tokyo, Tokyo, 106-8558, Japan
 SOURCE: Seisan Kenkyu (1999), 51(8), 622-625
 CODEN: SEKEAI; ISSN: 0037-105X
 PUBLISHER: Tokyo Daigaku Seisan Gijutsu Kenkyusho
 DOCUMENT TYPE: Journal; General Review
 LANGUAGE: English
 AB A review, with 7 refs., on a GaN-based light emitting source or photo-detector which has an elec. tunable Fabry-Perot cavity limited Bragg mirrors. The optical characteristics and dimensions of the cavity, e.g., the optical transfer functions of the cavity and the strain distribution on an upper Bragg mirror (membrane) and its four supporting legs, were calculated and designed by simulations using a model and a software.

L2 ANSWER 49 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:271737 CAPLUS
 DOCUMENT NUMBER: 131:95347
 TITLE: Current and future applications of nanoclusters
 AUTHOR(S): Schmid, Gunter; Baumle, Monika; Geerkens, Marcus; Heim, Ingo; Osemann, Christoph; Sawitowski, Thomas
 CORPORATE SOURCE: Institut fur Anorganische Chemie, Universitat Essen, Essen, D-45117, Germany
 SOURCE: Chemical Society Reviews (1999), 28(3), 179-185
 CODEN: CSRVBR; ISSN: 0306-0012
 PUBLISHER: Royal Society of Chemistry
 DOCUMENT TYPE: Journal; General Review
 LANGUAGE: English
 AB This article deals with some recent developments in metal and in semiconducting nanocluster science. The studies on the properties, mainly of metal nanoclusters, with respect to future and also to current applications are reviewed, including unpublished results on the use of Pd nanoclusters as hydrogenation catalysts. The general properties of metal clusters of 1 to a few nm are discussed on the basis of numerous phys. studies in the last few years. Quantum size effects open the door to novel future technologies. The success of future applications of nanoclusters will strongly depend on the availability of 3-, 2-, or 1-dimensionally organized materials. Finally, novel developments in generating semiconducting nanomaterials in transparent, nanoporous Al₂O₃ membranes are discussed. CdS and GaN can easily be prepared inside the pores to give photoluminescent foils of unlimited size.
 REFERENCE COUNT: 39 THERE ARE 39 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 50 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:69510 CAPLUS
 DOCUMENT NUMBER: 130:243828
 TITLE: Reduction of the energy gap pressure coefficient of GaN due to the constraining presence of the sapphire substrate
 AUTHOR(S): Perlin, Piotr; Mattos, Laila; Shapiro, Noad A.; Kruger, Joachim; Wong, William S.; Sands, Tim; Cheung, Nathan W.; Weber, Eicke R.
 CORPORATE SOURCE: Lawrence Berkeley National Laboratory, University of California at Berkeley, Berkeley, CA, 94720, USA
 SOURCE: Journal of Applied Physics (1999), 85(4), 2385-2389
 CODEN: JAPIAU; ISSN: 0021-8979
 PUBLISHER: American Institute of Physics
 DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors have performed a detailed study of the photoluminescence pressure dependence of heteroepitaxial GaN thin films on sapphire substrates. A comparison between as grown GaN on sapphire and free-standing GaN membranes, created using a laser assisted substrate liftoff process, revealed that the presence of the sapphire substrate leads to an energy gap pressure coefficient reduction of .apprx.5%. This result agrees with the numerical simulations presented. The linear pressure coefficient of free-standing GaN is 41.4 ± 0.2 meV/GPa, and the deformation potential of the energy gap is -9.36 ± 0.04 eV. Results also suggest a new, lower value of the pressure derivative for the bulk modulus of GaN ($B' = 3.5$).

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 51 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1998:735023 CAPLUS

DOCUMENT NUMBER: 130:9655

TITLE: Process for synthesis of cubic GaN on GaAs using NH₃ in an rf plasma process

INVENTOR(S): Shealy, James R.; Engstrom, James R.; Lo, Yu-Hwa

PATENT ASSIGNEE(S): Cornell Research Foundation Inc., USA

SOURCE: U.S., 12 pp.

CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5834379	A	19981110	US 1996-680874	19960716
PRIORITY APPLN. INFO.:			US 1996-680874	19960716

AB A process for synthesizing wide-band-gap materials, specifically GaN, employs plasma-assisted and thermal nitridation with NH₃ to convert GaAs to GaN. Thermally assisted nitridation with NH₃ can be employed for forming layers of substantial thickness (.apprx.1 μ m) of cubic and hexagonal GaN on a GaAs substrate. Plasma-assisted nitridation with NH₃ gives predominantly cubic GaN, a form particularly useful in optoelectronic devices. Preferably, very thin GaAs membranes are employed to permit formation of GaN layers of any desired thickness without concern for critical thickness constraints. The thin membranes are preferably formed either with an epitaxial bonding technique, or by undercut etching.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 52 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1998:435490 CAPLUS

DOCUMENT NUMBER: 129:154579

TITLE: Selective UV-laser processing for lift-off of GaN thin films from sapphire substrates

AUTHOR(S): Wong, W. S.; Kruger, J.; Cho, Y.; Linder, B. P.;

Weber, E. R.; Cheung, N. W.; Sands, T.

CORPORATE SOURCE: Department of Materials Science and Mineral Engineering, University of California, Berkeley, CA, 94720, USA

SOURCE: Proceedings - Electrochemical Society (1998), 98-2(Proceedings of the Symposium on Light Emitting Devices for Optoelectronic Applications, 1998), 377-384

CODEN: PESODO; ISSN: 0161-6374

PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Ga nitride (GaN) thin films on sapphire substrates were successfully separated and transferred onto Si substrates by pulsed UV-laser processing. A single 600 mJ/cm², 38 ns KrF excimer laser pulse was directed through the transparent substrate to induce a rapid thermal decomposition of the GaN at the GaN/sapphire interface. The decomposition yields metallic Ga and N₂ gas that allows separation of the GaN film from the substrate. Three-micron-thick free-standing **GaN membranes** were also fabricated using the laser lift-off technique. Surface roughness of the exposed interfacial layer is .apprx.24 nm (root-mean-square) by atomic force microscopy. Photoluminescence measurements of the **GaN membranes** showed no optical degradation of the **GaN** after lift-off from the sapphire. Based on a 10 meV blue-shift of the donor-bound exciton peak, an estimated biaxial compressive stress of .apprx.0.4 GPa in the GaN film was relieved by separation from the sapphire growth substrate.

REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L2 ANSWER 53 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:202390 CAPLUS

DOCUMENT NUMBER: 124:278593

TITLE: Enhanced sialidase activity and sialic acid content of erythrocyte **membrane** from betamethasone treated mice and their recovering effect of Keishi-bukuryo-**gan**

AUTHOR(S): Nagai, Takayuki; Chen, Xiao-Guang; Yamada, Haruki

CORPORATE SOURCE: Oriental Med. Res. Cent., Kitasato Inst., Tokyo, 108, Japan

SOURCE: Wakan Iyakugaku Zasshi (1995), 12(3), 195-201

CODEN: WIZAEL; ISSN: 1340-6302

PUBLISHER: Wakan Iyaku Gakkai

DOCUMENT TYPE: Journal

LANGUAGE: English

AB When beta-methasone was administered i.m. to C3H/HeN mice at 0.8 or 1.6 mg/kg/day for 7 days, thrombin time was reduced and fibrinogen content was increased in the plasma. The sialidase activity against ganglioside and N-acetylneuraminic acid content in the erythrocyte membrane were significantly increased by the administration of the glucocorticoid. When Kampo medicines, Keishi-bukuryo-**gan** (Gui-Xhi-Fu-Ling-Wan) and Tokaku-joki-to (Tao-He-Cheng-Qu-Tang), used clin. for the treatment of 'OPketsu' (blood stagnation) state was administered at 2 g/kg/day orally to the betamethasone treated mice for 7 days, the sialidase content in erythrocyte **membrane** and fibrinogen content in the plasma were reduced to the control level. The sialidase activity in erythrocyte **membrane** was also reduced by Keishi-bukuryo-**gan**, tut not by Tokaku-joki-to. Blood stagnation caused by glucocorticoid administration may somewhat caused by the alteration of sialylation and asialylation of erythrocyte **membrane** and that Keishi-bukuryo-**gan** can modulate these effects.

L2 ANSWER 54 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1979:435159 CAPLUS

DOCUMENT NUMBER: 91:35159

TITLE: Light scattering turbidity changes as a measure of the kinetics of calcium ion-promoted aggregation of chromaffin granule membrane ghosts

AUTHOR(S): Morris, S. J.; Hellweg, M. A.; Haynes, D. H.

CORPORATE SOURCE: Dep. Neurochem., Max-Planck-Inst. Biophys. Chem., Goettingen, D-3400, Fed. Rep. Ger.

SOURCE: Biochimica et Biophysica Acta, Biomembranes (1979),
553(2), 342-50
CODEN: BBBMBS; ISSN: 0005-2736
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Changes in turbidity seen when chromaffin granule **membrane**
ghosts are aggregated by Ca^{2+} can be modeled as dimerization of hollow
spheres using Rayleigh-**Gans**-Debye light-scattering theory. The
exptl. changes agree well with the calcns. Thus, if shape or refractive
index changes produced by osmotic perturbation, ion uptake, etc., can be
excluded, turbidity readings can be used to follow the progress of the
aggregation reaction of storage vesicles and other small particles or
macromols.

L2 ANSWER 55 OF 124 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1977:117845 CAPLUS

DOCUMENT NUMBER: 86:117845

TITLE: Selective light scattering from oriented
photosynthetic membranes

AUTHOR(S): Swenberg, C. E.; Geacintov, N. E.

CORPORATE SOURCE: Inst. Fund. Stud., Univ. Rochester, Rochester, NY, USA

SOURCE: Excited States Biol. Mol., Proc. Int. Conf. (1976),
Meeting Date 1974, 288-300. Editor(s): Birks, John B.
Wiley: Chichester, Engl.
CODEN: 35CQAY

DOCUMENT TYPE: Conference

LANGUAGE: English

AB The anisotropy and wavelength dependence of light scattered at 90°
from magnetically oriented Chlorella cells in suspension are interpreted
by using form factors calculated in the Rayleigh-**Gans** approximation, and
are discussed in terms of the orientation of chlorophyll mols. in the
photosynthetic **membranes**. The wavelength dependence of the
scattered light for different configurations of incident and scattered
light beams was constructed theor. The effect of shape, size,
polarizability anisotropy, and the chlorophyll a concentration in vivo were
used
in these calcns. This method yielded an effective degree of orientation
of chlorophyll a in vivo.

L2 ANSWER 56 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2006(22):16977 COMPENDEX

TITLE: Fabrication of **GaN** nanotubular material
using MOCVD with aluminum oxide **membrane**.

AUTHOR: Jung, Woo-Gwang (School of Advanced Materials
Engineering Kookmin University, Seongbuk-gu, Seoul,
136-702, South Korea); Jung, Se-Hyuck; Kung, Patrick
MEETING TITLE: Quantum Sensing and Nanophotonic Devices III.

MEETING ORGANIZER: SPIE

MEETING LOCATION: San Jose, CA, United States

MEETING DATE: 23 Jan 2006-26 Jan 2006

SOURCE: Proceedings of SPIE - The International Society for
Optical Engineering v 6127 2006., arn: 61270K

SOURCE: Quantum Sensing and Nanophotonic Devices III
CODEN: PSISDG ISSN: 0277-786X

PUBLICATION YEAR: 2006

MEETING NUMBER: 67348

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2006(22):16977 COMPENDEX

AB **GaN** nanotubular material is fabricated with aluminum oxide
membrane in MOCVD. SEM, XRD, TEM and PL are employed to

characterize the fabricated GaN nanotubular material. An aluminum oxide **membrane** with ordered nano holes is used as template. **Gallium nitride** is deposited at the inner wall of the nano holes in aluminum oxide template, and the nanotubular material with high aspect ratio is synthesized using the precursors of TMG and ammonia gas. Optimal synthesis condition in MOCVD is obtained successfully for the **gallium nitride** nanotubular material in this research. The diameter of GaN nanotube fabricated is approximately 200 - 250 nm and the wall thickness is about 40 50 nm. GaN nanotubular material consists of numerous fine GaN particulates with sizes ranging 15 to 30 nm. The composition of **gallium nitride** is confirmed to be stoichiometrically 1:1 for Ga and N by EDS. XRD and TEM analyses indicate that grains in GaN nanotubular material have nano-crystalline structure. No blue shift is found in the PL spectrum on the GaN nanotubular material fabricated in aluminum oxide template. 45 Refs.

L2 ANSWER 57 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2006(21):2986 COMPENDEX
TITLE: Optical properties of GaN photonic crystal
membrane nanocavities at blue wavelengths.
AUTHOR: Choi, Yong Seok (Department of Electrical and Computer
Engineering Materials Department University of
California, Santa Barbara, CA 93106, United States);
Meier, Cedrik; Sharma, Rajat; Hennessy, Kevin;
Haberer, Elaine D.; Nakamura, Shuji; Hu, Evelyn L.
MEETING TITLE: 2005 Materials Research Society Fall Meeting.
MEETING LOCATION: Boston, MA, United States
MEETING DATE: 28 Nov 2005-02 Dec 2005
SOURCE: Materials Research Society Symposium Proceedings v 892
2006.p 491-496
CODEN: MRSPDH ISSN: 0272-9172
PUBLICATION YEAR: 2006
MEETING NUMBER: 67258
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2006(21):2986 COMPENDEX
AB We have investigated the design parameters for high-Q photonic-crystal
(PC) bandgap modes in the emission wavelengths of InGaN/GaN
multiple quantum wells. We demonstrate experimental schemes to realize 2D
triangular-lattice PC **membrane** structures, which is essential to
obtain photonic bandgap (PBG) modes, and the optical properties of L7
membrane nanocavities that consist of seven missing holes in the
gamma-K direction. L7 cavities show pronounced resonances with Q factors
of 300 to 800 in the PBG as well as the enhancement of light extraction of
the broad InGaN/GaN multiple-quantum-well emission by the 2D
PBG. \$CPY 2006 Materials Research Society. 10 Refs.

L2 ANSWER 58 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2006(17):8690 COMPENDEX
TITLE: Nonlithographic fabrication of nanostructured arrays
using anodic aluminum oxide films containing highly
ordered arrays of pores of 10 to 50nm.
AUTHOR: Yin, A.J. (Division of Engineering Brown University,
Providence, RI 02912, United States); Kossyrev, P.;
Cloutier, S.G.; Guico, R.S.; Kim, J.H.; Xu, J.M.
MEETING TITLE: 208th Meeting of The Electrochemical Society.
MEETING LOCATION: Los Angeles, CA, United States
MEETING DATE: 16 Oct 2005-21 Oct 2005
SOURCE: Meeting Abstracts v MA 2005-02 2005.p 2502
SOURCE: 208th Meeting of The Electrochemical Society - Meeting

Abstracts

ISSN: 1091-8213

PUBLICATION YEAR: 2005
MEETING NUMBER: 67008
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2006(17):8690 COMPENDEX

AB The fabrication of highly ordered and highly uniform structured arrays using conventional Holographic techniques tuned to length scales less than 100 nm is quite challenging. A nonlithographic approach utilizing anodic aluminum oxide (AAO) porous films (pore diameter around 60 nm) as an evaporation or dry etching mask has proven to be successful for the fabrication of various nanostructured arrays (dots, anti-dots, and pillars) on different substrates as reported by both our group and other groups. However, nanostructures containing sub-50 nm features are often needed and their non-lithographic fabrication processes remain largely unexamined. Here, we present for the first time the fabrication of periodically structured AAO through-pore films, i.e. **membranes**, with diameters down to 10 nm. **Membranes** with a pore spacing of approximately 100 nm and pore diameters ranging from 30 to 80 nm were obtained using an oxalic acid bath. **Membranes** with pore diameters ranging from 10 to 25 nm and pore spacings ranging from 25 to 50 nm were obtained using a sulfuric acid bath. Effects of the anodization conditions on the properties of the AAO porous films, specifically brittleness, thickness, and wet-etch rate, were studied. By utilizing these sub-50 nm **membranes** as a growth stencil, we produced highly ordered nanodot, anti-dot, and nanopillar arrays of various metal and semiconductor materials on different substrates (quartz, Si, GaAs, **GaN**, and polymer films). By diminishing the length scale of the **membrane** features, effects due to quantum confinement and size can be drastically enhanced enabling broad applications of the nanostructures. The exceptional ordering and uniformity would also be beneficial in accessing nanostructure interactions, useful in radiation sensing as well as optical emission applications. Utilizing AAO porous films opens a non-lithographic growth pathway for the fabrication of highly ordered sub-50nm structures.

L2 ANSWER 59 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2006(5):7035 COMPENDEX

TITLE: Visible resonant modes in **GaN**-based photonic crystal **membrane** cavities.

AUTHOR: Meier, Cedrik (University of Duisburg - Essen
Experimental Physics, D-47048 Duisburg, Germany);
Hennessy, Kevin; Haberer, Elaine D.; Sharma, Rajat;
Choi, Yong-Seok; McGroddy, Kelly; Keller, Stacia;
DenBaars, Steven P.; Nakamura, Shuji; Hu, Evelyn L.

SOURCE: Applied Physics Letters v 88 n 3 2006.p 1-3, arn:
031111

CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2006

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2006(5):7035 COMPENDEX

AB Photonic crystal **membrane** cavities play a key role as building blocks in the realization of several applications, including quantum information and photonic circuits. Thus far, there has been no work on defect cavities with active layers emitting in the UV to green range of the spectrum based on the (Al,In,Ga)N material system. While this material system has great potential for a new generation of optoelectronic devices, there are several obstacles for the fabrication of **GaN**-based

membrane cavities, including the absence of a conventional selective chemical wet etch. Here, we demonstrate the first fabrication of fully undercut GaN photonic crystal membranes containing an InGaN multiquantum well layer, fabricated using band-gap-selective photoelectrochemical etching. A postfabrication coating of Ta₂O₅ is used to tune the cavity modes into resonance with the quantum well emission, and the fabricated membranes exhibit resonant modes with Q=300. \$CPY 2006 American Institute of Physics. 18 Refs.

L2 ANSWER 60 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(52):7081 COMPENDEX

TITLE: Fabrication of GaN nanotubular material using MOCVD with an aluminium oxide membrane

AUTHOR: Jung, Woo-Gwang (School of Advanced Materials Engineering Kookmin University, Songbuk-gu, Seoul 136-702, South Korea); Jung, Se-Hyuck; Kung, Patrick; Razeghi, Manijeh

SOURCE: Nanotechnology v 17 n 1 Jan 14 2006 2006.p 54-59
CODEN: NNOTER ISSN: 0957-4484 E-ISSN: 1361-6528

PUBLICATION YEAR: 2006

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2005(52):7081 COMPENDEX

AB GaN nanotubular material is fabricated with an aluminium oxide membrane in MOCVD. SEM, XRD, TEM and PL are employed to characterize the fabricated GaN nanotubular material. An aluminium oxide membrane with ordered nanoholes is used as a template. Gallium nitride is deposited at the inner wall of the nanoholes in the aluminium oxide template, and the nanotubular material with high aspect ratio is synthesized using the precursors of TMG and ammonia gas. Optimal synthesis conditions in MOCVD are obtained successfully for the gallium nitride nanotubular material in this research. The diameter of the GaN nanotube fabricated is approximately 200-250 nm and the wall thickness is about 40-50 nm. GaN nanotubular material consists of numerous fine GaN particulates with size range 15-30 nm. The composition of gallium nitride is confirmed to be stoichiometrically 1:1 for Ga and N by EDS. XRD and TEM analyses indicate that the grains in GaN nanotubular material have a nano-crystalline structure. No blue shift is found in the PL spectrum on the GaN nanotubular material fabricated in an aluminium oxide template. 45 Refs.

L2 ANSWER 61 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(52):549 COMPENDEX

TITLE: Piezoelectric polarization-induced two dimensional electron gases in AlGaIn/GaN heteroepitaxial structures: Application for micro-pressure sensors.

AUTHOR: Chu, S.N.G. (Multiplex Inc., South Plainfield, NJ 07080, United States); Ren, F.; Pearton, S.J.; Kang, B.S.; Kim, S.; Gila, B.P.; Abernathy, C.R.; Chyi, J.-I.; Johnson, W.J.; Lin, J.

SOURCE: Materials Science and Engineering A v 409 n 1-2 Nov 15 2005 2005.p 340-347
ISSN: 0921-5093

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2005(52):549 COMPENDEX

AB The wurtzite group-III nitrides exhibit piezoelectric polarization along

their c-axis. Differential piezoelectric and spontaneous polarizations in strained AlGaIn/GaN heterostructure grown on [0 0 0 1] sapphire substrates induce two-dimensional electron gas (2DEG) at the AlGaIn/GaN hetero-interface. By using a simple two-terminal device in a bending configuration, we demonstrate a linear dependence of the 2DEG channel conductance with applied bending strain. A detailed analysis of the elastic strain distribution in the multilayer structure indicates that the applied strain dependence of the conductance is directly proportional to the electron mobility of 2DEG. Thus, the bending test provides a new technique for measuring the electron mobility in this structure. For a mesa-structure device with a partially relaxed applied strain in the top AlGaIn layer, the theory further predicts a reversal in the applied strain dependence of the channel conductance for strain relaxation greater than 15% and this prediction is confirmed by the experiment. Finally, the feasibility of fabricating a micro-pressure sensor using a 150 μm diameter thin flexible AlGaIn/GaN circular **membrane** with an interdigitated-fingers device on a (1 1 1) Si substrate is demonstrated. The measured pressure sensitivity is 0.07 mS/bar. \$CPY 2005 Elsevier B.V. All rights reserved. 14 Refs.

L2 ANSWER 62 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(51):11780 COMPENDEX

TITLE: **GaN** blue photonic crystal **membrane** nanocavities.

AUTHOR: Choi, Y.-S. (Department of Electrical and Computer Engineering University of California); Hennessy, K.; Sharma, R.; Haberer, E.; Gao, Y.; Denbaars, S.P.; Nakamura, S.; Hu, E.L.; Meier, C.

SOURCE: Applied Physics Letters v 87 n 24 2005.p 1-3, arn: 243101

CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2005(51):11780 COMPENDEX

AB **GaN**-based photonic-crystal **membrane** nanocavities with Q factors up to 800 have been realized at the wavelength of [similar to]480 nm. The tuning behavior agrees well with numerical calculations using the finite-difference time-domain method. Theoretically, the lowest energy mode of a cavity that consists of seven missing holes in the gamma-K direction promises a Q factor as high as 4×10^4 with a mode volume of about $1.3 \times (\lambda/\text{nd})^3$. \$CPY 2005 American Institute of Physics. 19 Refs.

L2 ANSWER 63 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(37):8890 COMPENDEX

TITLE: Capacitance pressure sensor based on **GaN** high-electron-mobility transistor-on-Si **membrane**.

AUTHOR: Kang, B.S. (Department of Chemical Engineering University of Florida, Gainesville, FL 32611, United States); Kim, J.; Jang, S.; Ren, F.; Johnson, J.W.; Therrien, R.J.; Rajagopal, P.; Roberts, J.C.; Piner, E.L.; Linthicum, K.J.; Chu, S.N.G.; Baik, K.; Gila, B.P.; Abernathy, C.R.; Pearton, S.J.

SOURCE: Applied Physics Letters v 86 n 25 2005.p 1-3

CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2005(37):8890 COMPENDEX

AB The changes in the capacitance of the channel of an AlGa_N/Ga_N high-electron-mobility transistor (HEMT) **membrane** structure fabricated on a Si substrate were measured during the application of both tensile and compressive strain through changes in the ambient pressure. The capacitance of the channel displays a change of $7.19 \pm 0.45 \times 10^{-3}$ pF/ μm as a function of the radius of the **membrane** at a fixed pressure of +9.5 bar and exhibits a linear characteristic response between -0.5 and +1 bar with a sensitivity of 0.86 pF/bar for a 600 μm radius **membrane**. The hysteresis was 0.4% in the linear range. These AlGa_N/Ga_N HEMT **membrane**-based sensors appear to be promising for both room-temperature and elevated-temperature pressure-sensing applications. \$CPY 2005 American Institute of Physics. 21 Refs.

L2 ANSWER 64 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(35):6079 COMPENDEX

TITLE: Hexagonal-arranged ZnO nanowire arrays by using Au nanohole membranes as fabrication template.

AUTHOR: Fan, H.J. (Max Planck Institute of Microstructure Physics, 06120 Halle, Germany); Lee, W.; Nielsch, K.; Zacharias, M.; Dadgar, A.; Krost, A.
2004 MRS Fall Meeting.

MEETING TITLE: 2004 MRS Fall Meeting.

MEETING ORGANIZER: Materials Research Society, MRS

MEETING LOCATION: Boston, MA, United States

MEETING DATE: 29 Nov 2004-02 Dec 2004

SOURCE: Materials Research Society Symposium Proceedings v 849
2005.p 47-52

SOURCE: Kinetics-Driven Nanopatterning on Surfaces
CODEN: MRSPDH ISSN: 0272-9172

PUBLICATION YEAR: 2005

MEETING NUMBER: 65441

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical

LANGUAGE: English

AN 2005(35):6079 COMPENDEX

AB A new template method for large-scale fabrication of hexagonally patterned and vertically aligned ZnO nanowires is demonstrated. The process involves a novel type of metal **membrane**, a gold catalyst template produced using the **membrane** as deposition mask, and the catalyst-guided growth of ZnO nanowires. The metal **membranes**, composed of hexagonal nanohole arrays, are electrochemically replicated from ordered porous alumina. The ZnO nanowires obtained have a uniform alignment perpendicular to the Ga_N surface and a distribution according to the pattern defined by the nanohole **membrane**. Such periodically arranged ZnO nanowires have potential applications as sensor arrays and piezoelectric transducers. \$CPY 2005 Materials Research Society. 14 Refs.

L2 ANSWER 65 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(22):1113 COMPENDEX

TITLE: Arrays of vertically aligned and hexagonally arranged ZnO nanowires: A new template-directed approach.

AUTHOR: Fan, Hong Jin (Max Planck Institute of Microstructure Physics, 06120 Halle, Germany); Lee, Woo; Scholz, Roland; Dadgar, Armin; Krost, Alois; Nielsch, Kornelius; Zacharias, Margit

SOURCE: Nanotechnology v 16 n 6 Jun 1 2005 2005.p 913-917
CODEN: NNOTER ISSN: 0957-4484

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2005(22):1113 COMPENDEX

AB A new template-directed method for large-scale fabrication of hexagonally patterned and vertically aligned ZnO nanowires is demonstrated. The process involves a novel type of metal **membrane**, gold catalyst templates produced using the **membrane** as the deposition mask, and catalyst-guided vapour-phase growth of ZnO nanowires. The metal **membranes**, composed of hexagonal nanotube arrays, are electrochemically replicated from ordered porous alumina. The obtained ZnO nanowires are uniformly aligned perpendicular to the **GaN** surface and have a distribution according to the pattern defined by the nanotube **membrane**. We also demonstrate that by modifying the electrochemical parameters and growth conditions, the diameter of the nanowires can be varied in the range 30-110 nm. \$CPY 2005 IOP Publishing Ltd. 18 Refs.

L2 ANSWER 66 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(20):2385 COMPENDEX

TITLE: GaN based piezo sensors.

AUTHOR: Neuburger, M. (Dept. of Electron Devices and Circuits, University of Ulm, 89081 Ulm, Germany); Zimmermann, T.; Benkart, P.; Kunze, M.; Daumiller, I.; Dadgar, A.; Krost, A.; Kohn, E.

MEETING TITLE: Device Research Conference - Conference Digest, 62nd DRC.

MEETING ORGANIZER: IEEE Electron Devices Society

MEETING LOCATION: Notre Dame, IN, United States

MEETING DATE: 21 Jun 2004-23 Jun 2004

SOURCE: Device Research Conference - Conference Digest, DRC 2004.p 45-46, (IEEE cat n 04TH8724) ISSN: 1548-3770

PUBLICATION YEAR: 2004

MEETING NUMBER: 64663

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2005(20):2385 COMPENDEX

AB The fabrication of free standing **GaN membrane** and cantilever structures using RIE and ICP dry etching was described. The sample **GaN** heterostructures were grown on 111-oriented Si wafers using MOCVD and multiple AlN stress release layers. The piezo-response of the **GaN** base layers, which was highly insulating by compensation and contained highly polar AlN stress release layers, was also investigated. It was observed from simulation of the AlGaN/**GaN** HEMT and MESFET devices that the change in the sheet charge density should be in the order of 10^{12} cm^{-2} . (Edited abstract) 1 Refs.

L2 ANSWER 67 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(18):1703 COMPENDEX

TITLE: Piezoelectric polarization induced two dimensional electron gases in AlGaN/GaN heteroepitaxial structures: An application for micro-pressure sensors.

AUTHOR: Chu, S.N.G. (Multiplex Inc., South Plainfield, NJ 07080, United States); Ren, F.; Pearton, S.J.; Kang, B.S.; Kim, S.; Gila, B.P.; Abernathy, C.R.; Lin, J.

SOURCE: JOM v 56 n 11 November 2004 2004.p 345

CODEN: JOMMER ISSN: 1047-4838

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2005(18):1703 COMPENDEX

AB The wurtzite group-III nitrides exhibit piezoelectric polarization along their c-axis. Differential piezoelectric and spontaneous polarizations in strained AlGa**N**/Ga**N** heterostructure grown [0001] sapphire substrates induce two-dimensional electron gas (2DEG) at the AlGa**N**/Ga**N** hetero-interface. AlGa**N**/Ga**N** high electron mobility transistors (HEMT) based on electrical polarization induced 2DEG are therefore sensitive to the applied stresses. We demonstrate the feasibility of fabrication of such devices and their response to the applied stresses. Since these devices can be made onto small thin Ga**N** membranes by removing locally the sapphire substrate using the present state-of-the-art micro-fabrication technologies, pressure sensors in the micrometer scale are possible. AlGa**N**/Ga**N** /sapphire material system is ideal for high temperature applications as well as for harsh chemically environments. It can also be a potential micro-sensor for medical implant applications. A detailed theoretical analysis of the dependence of trans-conductance of HEMT device on the applied stresses is provided to give insight to the stress response mechanism of the device.

L2 ANSWER 68 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(15):1620 COMPENDEX
TITLE: Determination of acetone in breath.
AUTHOR: Teshima, Norio (Dept. of Chemistry and Biochemistry
Texas Tech. University, Lubbock, TX 79409-1061, United
States); Li, Jianzhong; Toda, Kei; Dasgupta, Purnendu
K.
SOURCE: Analytica Chimica Acta v 535 n 1-2 Apr 11 2005 2005.p
189-199
CODEN: ACACAM ISSN: 0003-2670
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2005(15):1620 COMPENDEX

AB A light emitting diode (LED)-based photometric method for the measurement of gaseous acetone in human breath is presented. The detection chemistry is based on the reaction of acetone with alkaline salicylaldehyde to form a colored product, which absorbs in the blue and can be monitored with Ga**N**-based LEDs with emission centered at 465 nm. Gaseous acetone in breath is sampled with a porous membrane based diffusion scrubber (DS). The collected sample in the continuously flowing water carrier reacts with the reagent solution. We have used two approaches to collect breath acetone: the use of a face mask and a Mylar balloon as a collection bag. With the face mask approach, the expired air can be measured over long periods without major subject discomfort, balloon collection (5 l) permits four measurements from a single fill. The LED-based liquid core waveguide (LCW) absorbance detector utilized sapphire ball lenses to prevent exposure of other optical components to a hot alkaline reagent solution. The high refractive index of the final mixture permitted the use of an inexpensive fluorinated ethylene copolymer (FEP Teflon [registered trademark]) tube as a 10 cm long LCW. The limit of detection (S/N = 3) is 14 ppbv gaseous acetone, and the linear range extends to 1.21 ppmv. The concentration range in 11 volunteer subjects ranged from 176 to 518 ppbv. \$CPY 2004 Elsevier B.V. All rights reserved. 54 Refs.

L2 ANSWER 69 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(6):1737 COMPENDEX
TITLE: Depletion of apolipoprotein N-acyltransferase causes mislocalization of outer membrane lipoproteins in Escherichia coli.
AUTHOR: Robichon, Carine (Molecular Genetics Unit CNRS URA2172

SOURCE: Institut Pasteur, 75724 Paris Cedex 5, France);
Vidal-Ingigliardi, Dominique; Pugsley, Anthony P.
Journal of Biological Chemistry v 280 n 2 Jan 14 2005
2005.p 974-983
CODEN: JBCHA3 ISSN: 0021-9258
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2005(6):1737 COMPENDEX

AB Lipoproteins in Gram-negative Enterobacteriaceae carry three fatty acids on the N-terminal cysteine residue, two as a diacylglyceride and one through an N-linkage following signal peptide cleavage. Most lipoproteins are anchored in the outer **membrane**, facing the periplasm, but some lipoproteins remain in the plasma **membrane**, depending on the amino acid at position +2, immediately after the fatty-acylated cysteine. In vitro, the last step in lipoprotein maturation, N-acylation of apolipoproteins by the plasma **membrane** apolipoprotein N-acyltransferase (Lnt), is necessary for efficient recognition of outer **membrane** lipoproteins by the Lol system, which transports them from the plasma to the outer **membrane** (Fukuda, A., Matsuyama, S.-I., Hara, T., Nakayama, J., Nagasawa, H., and Tokuda, H. (2002) J. Biol. Chem. 277, 43512-43518). To study the role of Lnt in vivo, we constructed a conditional lnt mutant of Escherichia coli. The apo-form of peptidoglycan-anchored major lipoprotein (Lpp) and two other outer **membrane** lipoproteins accumulated in the plasma **membrane** when Lnt expression was reduced. We also found that Lnt is an essential protein in E. coli and that the lethality is partially because of the retention of apoLpp in the plasma **membrane**. Topology mapping of Lnt with beta-galactosidase and alkaline phosphatase fusions indicated the presence of six **membrane**-spanning segments. The lnt gene in a mutant of Salmonella enterica displaying thermosensitive Lnt activity (Gupta, S. D., Gan, K., Schmid, M. B., and Wu, H. C. (1993) J. Biol. Chem. 268, 16551-16556) was found to carry a mutation causing a single glutamate to lysine substitution at a highly conserved position in the last predicted periplasmic loop of the protein. 52 Refs.

L2 ANSWER 70 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(48):6060 COMPENDEX
TITLE: Pressure-induced changes in the conductivity of AlGaIn/GaN high-electron mobility-transistor **membranes**.

AUTHOR: Kang, B.S. (Dept. of Mat. Sci. and Engineering
University of Florida, Gainesville, FL 32611, United States); Kim, S.; Ren, F.; Johnson, J.W.; Therrien, R.J.; Rajagopal, P.; Roberts, J.C.; Piner, E.L.; Linthicum, K.J.; Chu, S.N.G.; Baik, K.; Gila, B.P.; Abernathy, C.R.; Pearton, S.J.

SOURCE: Applied Physics Letters v 85 n 14 Oct 4 2004 2004.p 2962-2964

CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2004(48):6060 COMPENDEX

AB AlGaIn/GaN high-electron-mobility transistors (HEMT) showing strong dependence of source/drain current on the piezoelectric-polarization-induced two-dimensional electron gas was discussed. It was suggested that the spontaneous and piezoelectric-polarization-induced surface and interface charges can be used to develop very sensitive but robust sensors for the detection of pressure changes. The conductivity of the channel was

found to show a linear change of $- (+) 6.4 \times 10^{-2}$ mS/bar for application of compressive (tensile) strain. The AlGaIn/GaN HEMT **membrane**-based sensors were suggested to be promising for pressure sensing applications. (Edited abstract) 20 Refs.

L2 ANSWER 71 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(47):5542 COMPENDEX

TITLE: Gratings in **GaN membranes**.

AUTHOR: Chen, Chii-Chang (Institute of Optical Sciences
National Central University, 320 Jung-Li, Taiwan);
Hou, Chia-Hung; Sheu, Jinn-Kong; Chang, Jenq-Yang;
Ming-Hung, L.I.; Chi, Gou-Chung; Wu, Chuck
SOURCE: Japanese Journal of Applied Physics, Part 1: Regular
Papers and Short Notes and Review Papers v 43 n 8 B
August 2004 2004.p 5854-5856
CODEN: JAPNDE ISSN: 0021-4922

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2004(47):5542 COMPENDEX

AB In this work, gratings are fabricated on the **GaN** thin film grown on the silicon substrates. **GaN membranes** are obtained by removing the silicon below the **GaN** gratings. The samples are stacked on the **GaN** diffractive microlenses on sapphire substrates fabricated using gray-level masks. The stacked components are characterized using a He-Ne laser. The laser beam is collimated by the **GaN** microlenses and diffracted by the **GaN** gratings. The result demonstrates a stacked microoptics systems in **GaN**-based materials for the first time. 13 Refs.

L2 ANSWER 72 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(46):4235 COMPENDEX

TITLE: Nano-dot addition effect on the electrical properties of Ni contacts to p-type **GaN**.

AUTHOR: Sohn, Jung Inn (Dept. of Mat. Sci. and Engineering
Kwangju Inst. of Sci. and Technology, Kwangju 500-712,
South Korea); Song, June-O.; Leem, Dong-Seok; Lee,
Seonghoon; Seong, Tae-Yeon

SOURCE: Physica Status Solidi C: Conferences v 1 n 10 2004.p
2524-2527
ISSN: 1610-1634

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2004(46):4235 COMPENDEX

AB The correlations between the electrical behaviors of Ni contacts on p-**GaN** and the insertion of metal nano-dots at the Ni/**GaN** interfaces have been investigated. The Pt, Au, and Ti nano-dots directly deposited on p-**GaN** using the anodic porous alumina **membrane** mask by electron beam evaporation. It is shown that the samples with the inserted nano-dots exhibit better electrical behaviors compared with those without the nano-dots. The improvement of the electrical behaviors is explained in terms of the difference of the Schottky barrier heights between the Ni film and the metal nano-dots, and the enhanced electrical field at the Ni/**GaN** interfaces due to the presence of the nano-dots. Based on experimental and theoretical results, the possible mechanisms for the improved electrical behaviors is discussed. \$CPY 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim. 12 Refs.

L2 ANSWER 73 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(46):4212 COMPENDEX
TITLE: Cleaved laser facets on free-standing InGaN LD membrane created by laser lift-off and structural characterisation of the membrane.
AUTHOR: Li, Zilan (State Key Lab. Artif. M./M.P. Department of Physics Peking University, Beijing, 100871, China); Hu, Xiaodong; Qin, Zhixin; Yu, Tongjun; Nie, Ruijuan; Lu, Min; Ren, Qian; Zhang, Bei; Yang, Zhijian; Chen, Weihua; Chen, Zhizhong; Yang, Hua; Zhang, Guoyi
SOURCE: Physica Status Solidi C: Conferences v 1 n 10 2004.p 2425-2428
ISSN: 1610-1634
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2004(46):4212 COMPENDEX

AB Cleaved laser facets on free-standing InGaN laser diode **membrane** created by laser lift-off were fabricated and studied. Cleaved laser facets on **GaN** on sapphire have been compared with those on free-standing laser **membrane**. Atomic force microscopy and scanning electron microscopy results show that the cleaved laser facets on free-standing laser **membrane** are much smoother than those on sapphire. Transmission electron microscopy images show that no significant crystal quality degradation has been introduced during the laser lift-off process. \$CPY 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim. 7 Refs.

L2 ANSWER 74 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(46):4189 COMPENDEX
TITLE: Photoluminescence from InGaN/**GaN** MQWs on sapphire and **membranes** fabricated by laser lift-off.
AUTHOR: Yu, Tongjun (State Key Lab. Artif. M.M.P. School of Physics Peking University, Beijing 100871, China); Li, Zilan; Qin, Z.X.; Chen, Z.Z.; Yang, Z.J.; Hu, X.D.; Zhang, G.Y.
SOURCE: Physica Status Solidi C: Conferences v 1 n 10 2004.p 2783-2786
ISSN: 1610-1634
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2004(46):4189 COMPENDEX

AB Photoluminescence and Raman scattering spectra of InGaN/**GaN** MQWs on sapphire and **membranes** free of substrate fabricated by laser lift-off have been studied. It is observed that photoluminescence peak of 850 deg C annealed sample red-shifts from that of as grown sample, while in the case of **membrane** samples, the luminescence peak blue-shifts when annealed at 700deg C. In Raman scattering spectra, InGaN/**GaN** MQWs film without sapphire substrate has a lower E2 mode frequency (569.3 cm⁻¹) than that of the films with substrate (570.8 cm⁻¹), which indicates that compressive stress in the films releases partially when the sapphire substrate is taken off. It is believed that the piezoelectric field decrease leads to the blue-shift in luminescence spectra. Compared with the samples with sapphire substrate, the free-standing **membranes** showed blue-shift of luminescence peak after relatively low temperature annealing, because the piezoelectric field reduced more easily in the films without substrate. \$CPY 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim. 13 Refs.

L2 ANSWER 75 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(3):1927 COMPENDEX
TITLE: Characterization of GaN based Schottky UV detectors in the vacuum UV (VUV) and the soft X-ray (SX) region (10-100 nm).
AUTHOR: Motogaito, Atsushi (Dept. of Elec. and Electron. Eng. Mie University, Tsu, Mie 514-8507, Japan); Watanabe, Hironobu; Hiramatsu, Kazumasa; Fukui, Kazutoshi; Hamamura, Yutaka; Tadatomo, Kazuyuki
SOURCE: Physica Status Solidi (A) Applied Research v 200 n 1 November 2003 2003.p 147-150
CODEN: PSSABA ISSN: 0031-8965
PUBLICATION YEAR: 2003
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2004(3):1927 COMPENDEX

AB Responsivity spectra of **GaN** based Schottky type ultraviolet (UV) photodetectors with transparent electrode from the Vacuum Ultraviolet (VUV) region to soft X-ray (SX) region (10-100 nm, 124-12.4 eV) are described for the first time. The calculated transmittance of 10 nm-thick transparent Ni/Au electrode from the transmittance of Ti/Au **membrane** is about 0.5-0.7 in the VUV and SX region (10-100 eV). Thus it is considered that the 10-nm-transparent Ni/Au electrode is thin enough to transmit VUV and SX light into the transparent electrode. The value of responsivity in the SX region (at 13 nm) is about 0.05 A/W. 17 Refs.

L2 ANSWER 76 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2003(50):4202 COMPENDEX
TITLE: AlxGal-xN - A New Material System for Biosensors.
AUTHOR: Steinhoff, Georg (Walter Schottky Institute Technical University Munich, D-85748 Garching, Germany); Purucker, Oliver; Tanaka, Motomu; Stutzmann, Martin; Eickhoff, Martin
SOURCE: Advanced Functional Materials v 13 n 11 November 2003 2003.p 841-846
CODEN: AFMDC6 ISSN: 1616-301X
PUBLICATION YEAR: 2003
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2003(50):4202 COMPENDEX

AB The applicability of the group III nitride material system for the fabrication of semiconductor-based biosensors is demonstrated. The operation of ion-sensitive field-effect, transistors (ISFETs) based on AlGaN/**GaN** heterostructures in aqueous electrolytes is-shown to be characterized by high sensitivity and low drift. Fibroblasts in contact with oxidized and as-deposited AlGaN surfaces are demonstrated to survive at least for 24 h, indicating that these surfaces are chemically robust and non-toxic against living cells. Surface hydrophilization using thermal oxidation allows the deposition of highly mobile lipid **membranes** by vesicle fusion. The homogeneity and the diffusion properties, of phospholipids with different net charges were analyzed by fluorescence microscopy and constant photobleaching, taking advantage of the optical transparency of the AlGaN material system. The obtained results reveal that AlGaN-based devices are promising candidates for future multifunctional, biosensors. 43 Refs.

L2 ANSWER 77 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2003(40):7951 COMPENDEX
TITLE: Nanoheteroepitaxy of GaN on a nanopore array Si surface.

AUTHOR: Liang, J. (Division of Engineering Brown University
Box D, Providence, RI 02912, United States); Hong,
S.-K.; Kouklin, N.; Beresford, R.; Xu, J.M.
SOURCE: Applied Physics Letters v 83 n 9 Sep 1 2003 2003.p
1752-1754
CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2003
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2003(40):7951 COMPENDEX

AB The use of a highly ordered nanopore array **membrane** for
patterning Si(111) substrates and the subsequent heteroepitaxial growth of
GaN films with improved optical properties, were reported. The
thin anodized aluminum oxide **membrane** with densely packed highly
ordered straight nanopores was formed nonlithographically in the process
of anodizing high purity aluminum under carefully controlled conditions.
The nanopore array was scalable and the feature size and periodicity could
be varied over a wide range. (Edited abstract) 14 Refs.

L2 ANSWER 78 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2003(31):10944 COMPENDEX

TITLE: Development of a high lateral resolution electron beam
induced current technique for electrical
characterization of InGaN-based quantum well light
emitting diodes.

AUTHOR: Bunker, Kristin L. (Analytical Instrumentation and
Fac. Mat. Sci. and Eng. Dept. North Carolina State
University, Raleigh, NC 27695, United States);
Gonzalez, Juan Carlos; Batchelor, Dale; Stark,
Terrence J.; Russell, Phillip E.

MEETING TITLE: Gan and Related Alloys - 2002.

MEETING LOCATION: Boston, MA, United States

MEETING DATE: 02 Dec 2002-06 Dec 2002

SOURCE: Materials Research Society Symposium - Proceedings v
743 2002.p 615-620

CODEN: MRSPDH ISSN: 0272-9172

PUBLICATION YEAR: 2002

MEETING NUMBER: 61262

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2003(31):10944 COMPENDEX

AB Electron Beam Induced Current (EBIC) is a Scanning Electron Microscope
(SEM)-based technique that can provide information on the electrical
properties of semiconductor materials and devices. This work focuses on
the design and implementation of an EBIC system in a dedicated Scanning
Transmission Electron Microscope (STEM). The STEM-EBIC technique was used
in the characterization of an Indium **Gallium Nitride**
(InGaN) quantum well Light Emitting Diode (LED). The conventional "H-bar"
Transmission Electron Microscopy (TEM) sample preparation method using
Focused Ion Beam Micromachining (FEBM) was adapted to create an
electron-transparent **membrane** approximately 300 nm thick on the
sample while preserving the electrical activity of the device. A STEM-EBIC
sample holder with two insulated electrical feedthroughs making contact to
the thinned LED was designed and custom made for these experiments. The
simultaneous collection of Z-contrast images, EBIC images, and In and Al
elemental images allowed for the determination of the p-n junction
location, AlGaN and **GaN** barrier layers, and the thin InGaN
quantum well layer within the device. The relative position of the p-n
junction with respect to the thin InGaN quantum well was found to be (19
+- 3) nm from the center of the InGaN quantum well. 9 Refs.

L2 ANSWER 79 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2003(20):2637 COMPENDEX

TITLE: Microcavity light emitting diodes based on **GaN membranes** grown by molecular beam epitaxy on silicon.

AUTHOR: Duboz, Jean-Yves (Thales Research and Technology, 91404 Orsay, France); De L'Isle, Nadia Briere; Dua, Lydie; Legagneux, Pierre; Mosca, Mauro; Reverchon, Jean-Luc; Damilano, Benjamin; Grandjean, Nicolas; Semond, Fabrice; Massies, Jean; Dudek, Richard; Poitras, Daniel; Cassidy, Tom

SOURCE: Japanese Journal of Applied Physics, Part 1: Regular Papers and Short Notes and Review Papers v 42 n 1 January 2003 2003.p 118-121

CODEN: JAPNDE ISSN: 0021-4922

PUBLICATION YEAR: 2003

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2003(20):2637 COMPENDEX

AB Resonant-cavity InGaN/**GaN** quantum well light emitting diodes have been fabricated. Nitride layers were grown by molecular beam epitaxy on Si (111). We fabricated the structures using a combination of Si substrate etching, **GaN** etching and dielectric (Ta2O5/SiO2) mirror deposition. The electroluminescence spectra show that the emission within the distributed Bragg reflector stop band is enhanced in the **membrane** microcavity. The cavity modes are broadened by some cavity length non-uniformity that is introduced when the **GaN** is back etched to adjust the cavity length. This process does not need any transfer on an intermediate host substrate and is fully compatible with large area semiconductor processing. 17 Refs.

L2 ANSWER 80 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2003(18):9477 COMPENDEX

TITLE: Single-crystal gallium nitride nanotubes.

AUTHOR: Goldberger, Joshua (Department of Chemistry University of California, Berkeley, CA 94720, United States); He, Rongrui; Zhang, Yanfeng; Lee, Sangkwon; Yan, Haoquan; Choi, Heon-Jin; Yang, Peidong

SOURCE: Nature v 422 n 6932 Apr 10 2003.p 599-602

CODEN: NATUAS ISSN: 0028-0836

PUBLICATION YEAR: 2003

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2003(18):9477 COMPENDEX

AB Since the discovery of carbon nanotubes in 1991 (ref.1), there have been significant research efforts to synthesize nanometrescale tubular forms of various solids. The formation of tubular nanostructure generally requires a layered or anisotropic crystal structure. There are reports of nanotubes made from silica, alumina, silicon and metals that do not have a layered crystal structure; they are synthesized by using carbon nanotubes and porous **membranes** as templates, or by thin-film rolling. These nanotubes, however, are either amorphous, polycrystalline or exist only in ultrahigh vacuum. The growth of single-crystal semiconductor hollow nanotubes would be advantageous in potential nanoscale electronics, optoelectronics and biochemical-sensing applications. Here we report an 'epitaxial casting' approach for the synthesis of single-crystal **GaN** nanotubes with inner diameters of 30-200 nm and wall thicknesses of 5-50 nm. Hexagonal ZnO nanowires were used as templates for the epitaxial overgrowth of thin **GaN** layers in a chemical vapour

deposition system. The ZnO nanowire templates were subsequently removed by thermal reduction and evaporation, resulting in ordered arrays of **GaN** nanotubes on the substrates. This templating process should be applicable to many other semiconductor systems. 23 Refs.

L2 ANSWER 81 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2002(31):3092 COMPENDEX

TITLE: Morphology and Raman scattering spectrum of **GaN** nanowires embedded in nanochannels of templates.

AUTHOR: Zhang, Jun (Department of Physics Yantai University, Yantai 264005, China); Zhang, Lide

SOURCE: Journal of Physics D: Applied Physics v 35 n 13 Jul 7 2002 2002.p 1481-1485

CODEN: JPAPBE ISSN: 0022-3727

PUBLICATION YEAR: 2002

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2002(31):3092 COMPENDEX

AB The hexagonal wurtzite **GaN** nanowires embedded in the nanochannels of anodic alumina **membrane** were achieved by the direct reaction of Ga vapour with a constant flowing ammonia atmosphere. X-ray diffraction (XRD), scanning electron microscopy and transmission electron microscopy were used to measure the size and structures of the samples. The Raman scattering spectrum of ordered **GaN** nanowires was studied. The Raman spectrum of the **GaN** nanowire arrays is consistent with the hexagonal wurtzite structure **GaN**, in agreement with XRD observation. The E2(high), E1(TO), and A1(TO) phonon frequencies at 563, 553, and 529 cm⁻¹ show the low-energy shifts, respectively. The shifts and band broadening of the Raman modes result from the nanosize effect. 26 Refs.

L2 ANSWER 82 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2002(20):562 COMPENDEX

TITLE: CW InGaN multiple-quantum-well laser diodes on copper and diamond substrates by laser lift-off.

AUTHOR: Kneissl, Michael (Electronic Materials Laboratory XEROX Palo Alto Research Center, Palo Alto, CA 94304, United States); Wong, William S.; Treat, David W.; Teepe, Mark; Miyashita, Naoko; Johnson, Noble M.

SOURCE: Materials Science and Engineering B: Solid-State Materials for Advanced Technology v 93 n 1-3 May 30 2002 2002.p 68-72

CODEN: MSBTEK ISSN: 0921-5107

PUBLICATION YEAR: 2002

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2002(20):562 COMPENDEX

AB Continuous-wave (cw) InGaN multiple-quantum-well laser diodes grown on sapphire substrates by metalorganic chemical vapor deposition were successfully transferred onto copper and diamond using excimer laser lift-off. Room-temperature cw threshold currents as low as 87 mA with threshold voltages of 5.8 V were obtained for laser diodes on diamond substrates. **GaN**-based laser structures transferred onto Cu substrates show a significantly reduced thermal resistance resulting in a more than 2 * increase in cw output power of more than 100 mW. High-quality cleaved facet have been obtained for free-standing **GaN** laser **membranes** after sapphire substrate removal. \$CPY 2002 Elsevier Science B.V. All rights reserved. 12 Refs.

L2 ANSWER 83 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2001(20):5248 COMPENDEX
TITLE: AlGa~~N~~/Ga~~N~~ high electron mobility transistors on Si(111) substrates.
AUTHOR: Chumbes, E.M. (School of Electrical Engineering Cornell University, Ithaca, NY 14850, United States); Schremer, A.T.; Smart, J.A.; Wang, Y.; MacDonald, N.C.; Hogue, D.; Komiak, J.J.; Lichwalla, S.J.; Leoni, R.E.; Shealy, J.R.
SOURCE: IEEE Transactions on Electron Devices v 48 n 3 March 2001 2001.p 420-426
CODEN: IETDAI ISSN: 0018-9383
PUBLICATION YEAR: 2001
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental; Theoretical
LANGUAGE: English

AN 2001(20):5248 COMPENDEX

AB AlGa~~N~~/Ga~~N~~ high electron mobility transistors (HEMTs) on silicon substrates have for the first time been realized using organometallic vapor phase epitaxy (OMVPE). Using 1 omega-cm p-Si(111), these devices exhibited static output characteristics with low output conductance and isolation approaching 80 V. Under microwave rf operation, the substrate charge becomes capacitively coupled and parasitically loads these devices thereby limiting their performance. As a result, typical 0.3 mum gate length devices show a 25 GHz cutoff frequency, with near unity fmax / fT ratio and 0.55 W/mm output power. A small-signal equivalent circuit incorporating elements representing the parasitic substrate loading accurately models the measured S-parameters. Removal of the conductive substrate is one way to effectively eliminate this parasitic loading. Through backside processing, freestanding 0.4-mm HEMT **membranes** with no thermal management were demonstrated and exhibited a significant improvement in their fmax / fT ratio up to 2.5 at the cost of lower fT and fmax along with an almost four-fold reduction of Idss. 25 Refs.

L2 ANSWER 84 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2000(36):3505 COMPENDEX
TITLE: Highly ordered nanostructures of single crystalline Ga~~N~~ nanowires in anodic alumina **membranes**.
AUTHOR: Cheng, G.S. (Chinese Acad of Sciences, Hefei, China); Chen, S.H.; Zhu, X.G.; Mao, Y.Q.; Zhang, L.D.
MEETING TITLE: IUMRS-ICAM'99: Symposium A - Nanostructured Materials, The 5th IUMRS International Conference on Advanced Materials.
MEETING LOCATION: Beijing, China
MEETING DATE: 13 Jun 1999-18 Jun 1999
SOURCE: Materials Science and Engineering A: Structural Materials: Properties, Microstructure and Processing v 286 n 1 2000.p 165-168
CODEN: MSAPE3 ISSN: 0921-5093
PUBLICATION YEAR: 2000
MEETING NUMBER: 57052
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2000(36):3505 COMPENDEX

AB Synthesis of highly ordered nanostructures of single crystalline Ga~~N~~ nanowires in anodic alumina **membranes** was achieved through a gas reaction of Ga2O vapor with a constant ammonia atmosphere at 1000 degree C in the presence of nano-sized metallic indium catalysis. Atomic force microscopy, X-ray diffraction, Raman backscattering spectrum, scanning electron microscopy, and transmission electron microscopy indicate that the ordered nanostructure consists of the single

crystalline hexagonal wurtzite **GaN** nanowires with about 20 nm in diameter and 40 to approximately 50 μ m in length in the uniform nanochannels of the anodic alumina **membrane**.The vapor-liquid-solid (VLS) growth mechanism of the ordered nanostructure was discussed in detail.(Author abstract) 18 Refs.

L2 ANSWER 85 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 1999(43):730 COMPENDEX
TITLE: Synthesis of orderly nanostructure of crystalline **GaN** nanoparticles on anodic porous alumina **membrane**.
AUTHOR: Cheng, G.S. (Chinese Acad of Sciences, Hefei, China); Zhang, L.D.; Zhu, X.G.; Chen, S.H.; Li, Y.; Zhu, Y.; Fei, G.T.
SOURCE: Nanostructured Materials v 11 n 3 1999.p 421-426
CODEN: NMAEE7 ISSN: 0965-9773
PUBLICATION YEAR: 1999
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 1999(43):730 COMPENDEX

AB Synthesis of an orderly nanostructure of crystalline **GaN** nanoparticles on anodic porous alumina **membrane** through a gas reaction of Ga₂O vapor with a constant ammonia atmosphere at 900 degree C was achieved.The investigation using atomic force microscopy, x-ray diffraction, transmission electron microscopy and high resolution electron microscopy indicated that the orderly nanostructure consisted of polycrystalline **GaN** nanoparticles with a hexagonal wurtzite structure and about 10-20 nm in diameter.The growth mechanism of the orderly nanostructure of the **GaN** nanoparticles was discussed.The photoluminescence spectrum of the orderly nanostructure was also reported.(Author abstract) 17 Refs.

L2 ANSWER 86 OF 124 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 1999(34):3758 COMPENDEX
TITLE: Blood gas monitoring using micro-flow colorimetry.
AUTHOR: Cooney, Christopher (Arizona State Univ, Tempe, AZ, USA); Towe, Bruce C.
MEETING TITLE: Proceedings of the 1999 Optical Diagnostics of Biological Fluids IV.
MEETING ORGANIZER: SPIE; IBOS
MEETING LOCATION: San Jose, CA, USA
MEETING DATE: 26 Jan 1999-27 Jan 1999
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 3599 1999.p 110-116
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 1999
MEETING NUMBER: 55207
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 1999(34):3758 COMPENDEX

AB Optical monitoring of blood gas concentrations is achieved using sub microliter quantities of a colorimetric indicator continuously perfused through microdialysis hollow fiber **membranes** in blood contact.The hollow fiber **membranes**, selected based on their permeabilities in blood, are silicone for both oxygen and carbon dioxide sensing, and cuproammonium rayon for pH sensing.A sweep fluid passed through the lumen of these fibers undergoes a diffusive equilibrium with the blood and then is continuously mixed with an indicator.A 450 nm **gallium nitride** LED is used to excite an oxygen-sensitive fluorophore, ruthenium tris-(2,2 prime -bipyridyl) II

dichloride, which has a 620 nm emission peak that is analyzed with an orange coated photodetector. Gallium phosphide 555 nm LEDs are used to excite the 550 nm absorbance peak of phenol red for pH measurement and phenol red in a 35 mm bicarbonate buffer for CO₂ measurement. Accurate measurement of small absorbance and fluorescence changes using small bore capillary tubes allows good resolution of biochemical concentrations. Continuous replenishment of the indicator by flow lends itself to a stable method of biochemical analysis that has potential for long term performance. In vitro buffer studies demonstrate a resolution of plus / minus 0.5 mmHg for pCO₂, a plus / minus 1.5 mmHg for pO₂, and a plus / minus 0.003 pH. (Author abstract) 4 Refs.

L2 ANSWER 87 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8811423 INSPEC

TITLE: Piezoelectric polarization-induced two dimensional electron gases in AlGa_N/Ga_N heteroepitaxial structures: Application for micro-pressure sensors

AUTHOR: Chu, S.N.G.; (Multiplex Inc., South Plainfield, NJ, USA), Ren, F.; Pearton, S.J.; Kang, B.S.; Kim, S.; Gila, B.P.; Abernathy, C.R.; Chyi, J.-I.; Johnson, W.J.; Lin, J.

SOURCE: Materials Science & Engineering A (Structural Materials: Properties, Microstructure and Processing) (15 Nov. 2005), vol.409, no.1-2, p. 340-7, 14 refs. CODEN: MSAPE3, ISSN: 0921-5093 SICI: 0921-5093(20051115)409:1/2L.340:PPID;1-W Doc.No.: S0921-5093(05)00771-9 Published by: Elsevier, Switzerland

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: Switzerland

LANGUAGE: English

AN 2006:8811423 INSPEC

AB The wurtzite group-III nitrides exhibit piezoelectric polarization along their c-axis. Differential piezoelectric and spontaneous polarizations in strained AlGa_N/Ga_N heterostructure grown on [0001] sapphire substrates induce two-dimensional electron gas (2DEG) at the AlGa_N/Ga_N hetero-interface. By using a simple two-terminal device in a bending configuration, we demonstrate a linear dependence of the 2DEG channel conductance with applied bending strain. A detailed analysis of the elastic strain distribution in the multilayer structure indicates that the applied strain dependence of the conductance is directly proportional to the electron mobility of 2DEG. Thus, the bending test provides a new technique for measuring the electron mobility in this structure. For a mesa-structure device with a partially relaxed applied strain in the top AlGa_N layer, the theory further predicts a reversal in the applied strain dependence of the channel conductance for strain relaxation greater than 15% and this prediction is confirmed by the experiment. Finally, the feasibility of fabricating a micro-pressure sensor using a 150µm diameter thin flexible AlGa_N/Ga_N circular **membrane** with an interdigitated-fingers device on a (111) Si substrate is demonstrated. The measured pressure sensitivity is 0.07mS/bar. [All rights reserved Elsevier]

L2 ANSWER 88 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8804578 INSPEC

TITLE: Visible resonant modes in Ga_N-based photonic crystal **membrane** cavities

AUTHOR: Meier, C.; (Depts. of Mater. & Electr. & Comput. Eng., Univ. of California Santa Barbara, Duisburg, Germany), Hennessy, K.; Haberer, E.D.; Sharma, R.; Yong-Seok Choi; McGroddy, K.; Keller, S.; DenBaars,

SOURCE: S.P.; Nakamura, S.; Hu, E.L.
Applied Physics Letters (16 Jan. 2006), vol.88, no.3,
p. 31111-1-3, 18 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20060116)88:3L.31111:VRMB;1-G
Price: 0003-6951/2006/88(3)/031111-1(3)/\$23.00
Doc.No.: S0003-6951(16)04004-3
Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2006:8804578 INSPEC

AB Photonic crystal **membrane** cavities play a key role as building blocks in the realization of several applications, including quantum information and photonic circuits. Thus far, there has been no work on defect cavities with active layers emitting in the UV to green range of the spectrum based on the (Al,In,Ga)N material system. While this material system has great potential for a new generation of optoelectronic devices, there are several obstacles for the fabrication of GaN-based **membrane** cavities, including the absence of a conventional selective chemical wet etch. Here, we demonstrate the first fabrication of fully undercut GaN photonic crystal **membranes** containing an InGaN multiquantum well layer, fabricated using band-gap-selective photoelectrochemical etching. A postfabrication coating of Ta2O5 is used to tune the cavity modes into resonance with the quantum well emission, and the fabricated **membranes** exhibit resonant modes with Q=300

L2 ANSWER 89 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8787747 INSPEC

TITLE: Hexagonal-arranged ZnO nanowire arrays by using Au nanohole membranes as fabrication template

AUTHOR: Fan, H.J.; Lee, W.; Nielsch, K.; Zacharias, M.;
(Max-Planck Inst. fur Mikrostrukturphysik, Halle,
Germany), Dadgar, A.; Krost, A.

SOURCE: Kinetics-Driven Nanopatterning on Surfaces. Symposium
(Materials Research Society Symposium Proceedings
Vol.849), 2005, p. 47-52 of ix+232 pp., 14 refs.
Editor(s): Chason, E.; Gilmer, G.H.; Huang, H.; Wang,
E.

ISBN: 1 55899 797 0

Published by: Materials Research Society, Warrendale,
PA, USA

Conference: Kinetics-Driven Nanopatterning on
Surfaces. Symposium, Boston, MA, USA, 29 Nov.-2 Dec.
2004

DOCUMENT TYPE: Conference; Conference Article

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2006:8787747 INSPEC

AB A new template method for large-scale fabrication of hexagonally patterned and vertically aligned ZnO nanowires is demonstrated. The process involves a novel type of metal **membrane**, a gold catalyst template produced using the **membrane** as deposition mask, and the catalyst-guided growth of ZnO nanowires. The metal **membranes**, composed of hexagonal nanohole arrays, are electrochemically replicated from ordered porous alumina. The ZnO nanowires obtained have a uniform alignment perpendicular to the GaN surface and a distribution according to the pattern defined by the nanohole **membrane**. Such periodically arranged ZnO

membrane mask by electron beam evaporation, it is shown that the samples with the inserted nano-dots exhibit better electrical behaviors compared with those without the nano-dots. The improvement of the electrical behaviors is explained in terms of the difference of the Schottky barrier heights between the Ni film and the metal nano-dots, and the enhanced electrical field at the Ni/**GaN** interfaces due to the presence of the nano-dots. Based on experimental and theoretical results, the possible mechanisms for the improved electrical behaviors is discussed

L2 ANSWER 92 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2006:8698161 INSPEC
TITLE: Cleaved laser facets on free-standing InGaN LD membrane created by laser lift-off and structural characterisation of the membrane
AUTHOR: Li Zilan; Hu Xiaodong; Qin Zhixin; Yu Tongjun; Nie Ruijuan; Lu Min; Ren Qian; Zhang Bei; Yang Zhijian; Chen Weihua; Chen Zhizhong; Yang Hua; Zhang Guoyi (Dept. of Phys., Peking Univ., Beijing, China)
SOURCE: Physica Status Solidi C (2004), no.10, p. 2425-8
CODEN: PSSCGL, ISSN: 1610-1634
SICI: 1610-1634(2004)10L:2425:CLFF;1-C
Published by: Wiley-VCH, Germany
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental; Practical
COUNTRY: Germany
LANGUAGE: English

AN 2006:8698161 INSPEC
AB Cleaved laser facets on free-standing InGaN laser diode **membrane** created by laser lift-off were fabricated and studied. Cleaved laser facets on **GaN** on sapphire have been compared with those on free-standing laser **membrane**. Atomic force microscopy and scanning electron microscopy results show that the cleaved laser facets on free-standing laser **membrane** are much smoother than those on sapphire. Transmission electron microscopy images show that no significant crystal quality degradation has been introduced during the laser lift-off process

L2 ANSWER 93 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8505660 INSPEC
DOCUMENT NUMBER: A2005-18-0670-001; B2005-09-7230-018
TITLE: Capacitance pressure sensor based on **GaN** high-electron-mobility transistor-on-Si **membrane**
AUTHOR: Kang, B.S.; Kim, J.; Jang, S.; Ren, F.; (Dept. of Chem. Eng., Univ. of Florida, Gainesville, FL, USA), Johnson, J.W.; Therrien, R.J.; Rajagopal, P.; Roberts, J.C.; Piner, E.L.; Linthicum, K.J.; Chu, S.N.G.; Baik, K.; Gila, B.P.; Abernathy, C.R.; Pearton, S.J.
SOURCE: Applied Physics Letters (20 June 2005), vol.86, no.25, p. 253502-1-3, 21 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20050620)86:25L:253502:CPSB;1-X
Price: 0003-6951/2005/86(25)/253502-1(3)/\$22.50
Doc.No.: S0003-6951(05)04226-9
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2005:8505660 INSPEC DN A2005-18-0670-001; B2005-09-7230-018
AB The changes in the capacitance of the channel of an AlGaN/**GaN**

nanowires have potential applications as sensor arrays and piezoelectric transducers

L2 ANSWER 90 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER:- 2006:8699485 INSPEC

TITLE: Fabrication of **GaN** nanotubular material using MOCVD with an aluminium oxide **membrane**

AUTHOR: Woo-Gwang Jung; Se-Hyuck Jung; (Sch. of Adv. Mater. Eng., Kookmin Univ., Seoul, South Korea), Kung, P.; Razeghi, M.

SOURCE: Nanotechnology (14 Jan. 2006), vol.17, no.1, p. 54-9, 45 refs.

CODEN: NNOTER, ISSN: 0957-4484

SICI: 0957-4484(20060114)17:1L:54:FNMU;1-#

Price: 0957-4484/06/010054+06\$30.00

Doc.No.: S0957-4484(06)02157-X

Published by: IOP Publishing, UK

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: United Kingdom

LANGUAGE: English

AN 2006:8699485 INSPEC

AB **GaN** nanotubular material is fabricated with an aluminium oxide **membrane** in MOCVD. SEM, XRD, TEM and PL are employed to characterize the fabricated **GaN** nanotubular material. An aluminium oxide **membrane** with ordered nanoholes is used as a template. **Gallium nitride** is deposited at the inner wall of the nanoholes in the aluminium oxide template, and the nanotubular material with high aspect ratio is synthesized using the precursors of TMG and ammonia gas. Optimal synthesis conditions in MOCVD are obtained successfully for the **gallium nitride** nanotubular material in this research. The diameter of the **GaN** nanotube fabricated is approximately 200-250 nm and the wall thickness is about 40-50 nm. **GaN** nanotubular material consists of numerous fine **GaN** particulates with size range 15-30 nm. The composition of **gallium nitride** is confirmed to be stoichiometrically 1:1 for Ga and N by EDS. XRD and TEM analyses indicate that the grains in **GaN** nanotubular material have a nano-crystalline structure. No blue shift is found in the PL spectrum on the **GaN** nanotubular material fabricated in an aluminium oxide template

L2 ANSWER 91 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8698186 INSPEC

TITLE: Nano-dot addition effect on the electrical properties of Ni contacts to p-type **GaN**

AUTHOR: Jung inn Sohn; June-O Song; Dong-Seok Leem; (Dept. of Mater. Sci. & Eng., Kwangju Inst. of Sci. & Technol., South Korea), Seonghoon Lee; Tae-Yeon Seong

SOURCE: Physica Status Solidi C (2004), no.10, p. 2524-7

CODEN: PSSCGL, ISSN: 1610-1634

SICI: 1610-1634(2004)10L:2524:NAEE;1-V

Published by: Wiley-VCH, Germany

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: Germany

LANGUAGE: English

AN 2006:8698186 INSPEC

AB The correlations between the electrical behaviors of Ni contacts on p-**GaN** and the insertion of metal nano-dots at the Ni/**GaN** interfaces have been investigated. The Pt, Au, and Ti nano-dots directly deposited on p-**GaN** using the anodic porous alumina

high-electron-mobility transistor (HEMT) **membrane** structure fabricated on a Si substrate were measured during the application of both tensile and compressive strain through changes in the ambient pressure. The capacitance of the channel displays a change of $7.19 \pm 0.45 \times 10^{-3}$ pF/ μ m as a function of the radius of the **membrane** at a fixed pressure of +9.5 bar and exhibits a linear characteristic response between -0.5 and +1 bar with a sensitivity of 0.86 pF/bar for a 600 μ m radius **membrane**. The hysteresis was 0.4% in the linear range. These AlGaIn/GaN HEMT **membrane**-based sensors appear to be promising for both room-temperature and elevated-temperature pressure-sensing applications

L2 ANSWER 94 OF 124 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2005:8452074 INSPEC
 DOCUMENT NUMBER: A2005-14-0762-034; B2005-07-7230C-069
 TITLE: Characterization of GaN based Schottky UV detectors in the vacuum UV (VUV) and the soft X-ray (SX) region (10-100 nm)
 AUTHOR: Motogaito, A.; Watanabe, H.; Hiramatsu, K.; (Dept. of Electr. & Electron. Eng., Mie Univ., Tsu, Japan), Fukui, K.; Hamamura, Y.; Tadatomo, K.
 SOURCE: Physica Status Solidi C (2003), no.7, p. 147-50, 17 refs.
 CODEN: PSSCGL, ISSN: 1610-1634
 SICI: 1610-1634(2003)7L:147:CBSD;1-D
 Published by: Wiley-VCH, Germany
 Conference: 5th International Conference on Nitride Semiconductors (ICNS-5), Nara, Japan, 25-30 May 2003
 DOCUMENT TYPE: Conference; Conference Article; Journal
 TREATMENT CODE: Practical; Experimental
 COUNTRY: Germany
 LANGUAGE: English
 AN 2005:8452074 INSPEC DN A2005-14-0762-034; B2005-07-7230C-069
 AB Responsivity spectra of GaN based Schottky type ultraviolet (UV) photodetectors with transparent electrode from the Vacuum Ultraviolet (VUV) region to soft X-ray (SX) region (10-100 nm, 124-12.4 eV) are described for the first time. The calculated transmittance of 10 nm-thick transparent Ni/Au electrode from the transmittance of Ti/Au **membrane** is about 0.5-0.7 in the VUV and SX region (10-100 eV). Thus it is considered that the 10-nm-transparent Ni/Au electrode is thin enough to transmit VUV and SX light into the transparent electrode. The value of responsivity in the SX region (at 13 nm) is about 0.05 A/W

L2 ANSWER 95 OF 124 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2005:8432738 INSPEC
 DOCUMENT NUMBER: A2005-14-6865-011; B2005-07-2550N-019
 TITLE: Arrays of vertically aligned and hexagonally arranged ZnO nanowires: a new template-directed approach
 AUTHOR: Hong Jin Fan; Woo Lee; Scholz, R.; (Max Planck Inst. of Microstruct. Phys., Halle, Germany), Dadgar, A.; Krost, A.; Nielsch, K.; Zacharias, M.
 SOURCE: Nanotechnology (June 2005), vol.16, no.6, p. 913-17, 18 refs.
 CODEN: NNOTER, ISSN: 0957-4484
 SICI: 0957-4484(200506)16:6L:913:AVAH;1-U
 Price: 0957-4484/05/060913+05\$30.00
 Doc.No.: S0957-4484(05)89480-2
 Published by: IOP Publishing, UK
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Practical; Experimental
 COUNTRY: United Kingdom
 LANGUAGE: English

AN 2005:8432738 INSPEC DN A2005-14-6865-011; B2005-07-2550N-019
AB A new template-directed method for large-scale fabrication of hexagonally patterned and vertically aligned ZnO nanowires is demonstrated. The process involves a novel type of metal **membrane**, gold catalyst templates produced using the **membrane** as the deposition mask, and catalyst-guided vapour-phase growth of ZnO nanowires. The metal **membranes**, composed of hexagonal nanotube arrays, are electrochemically replicated from ordered porous alumina. The obtained ZnO nanowires are uniformly aligned perpendicular to the **GaN** surface and have a distribution according to the pattern defined by the nanotube **membrane**. We also demonstrate that by modifying the electrochemical parameters and growth conditions, the diameter of the nanowires can be varied in the range 30-110 nm

L2 ANSWER 96 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8379545 INSPEC
DOCUMENT NUMBER: A2005-11-7865K-056; B2005-06-2530C-026
TITLE: Photoluminescence from InGaN/**GaN** MQWs on sapphire and **membranes** fabricated by laser lift-off
AUTHOR: Tongjun Yu; Zilan Li; Qin, Z.X.; Chen, Z.Z.; Yang, Z.J.; Hu, X.D.; Zhang, G.Y. (Sch. of Phys., Peking Univ., Beijing, China)
SOURCE: Physica Status Solidi B (Oct. 2004), vol.241, no.12, p. 2783-6, 13 refs.
CODEN: PSSBBD, ISSN: 0370-1972
SICI: 0370-1972(200410)241:12L:2783:PFIM;1-P
Published by: Wiley-VCH, Germany
Conference: 5th International Symposium on Blue Laser and Light Emitting Diodes, Gyeongju, South Korea, 15-19 March 2004
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: Germany
LANGUAGE: English

AN 2005:8379545 INSPEC DN A2005-11-7865K-056; B2005-06-2530C-026
AB Photoluminescence and Raman scattering spectra of InGaN/**GaN** MQWs on sapphire and **membranes** free of substrate fabricated by laser lift-off have been studied. It is observed that photoluminescence peak of 850°C annealed sample red-shifts from that of as grown sample, while in the case of **membrane** samples, the luminescence peak blue-shifts when annealed at 700°C. In Raman scattering spectra, InGaN/**GaN** MQWs film without sapphire substrate has a lower E2 mode frequency (569.3 cm⁻¹) than that of the films with substrate (570.8 cm⁻¹), which indicates that compressive stress in the films releases partially when the sapphire substrate is taken off. It is believed that the piezoelectric field decrease leads to the blue-shift in luminescence spectra. Compared with the samples with sapphire substrate, the free-standing **membranes** showed blue-shift of luminescence peak after relatively low temperature annealing, because the piezoelectric field is reduced more easily in the films without substrate

L2 ANSWER 97 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8235322 INSPEC
DOCUMENT NUMBER: A2005-04-4283-008; B2005-02-4145-037
TITLE: Gratings in **GaN membranes**
AUTHOR: Chii-Chang Chen; Chia-Hung Hou; Jinn-Kong Sheu; Jenq-Yang Chang; (Inst. of Opt. Sci., Nat. Central Univ., Chung-li, Taiwan), Ming-Hung Li; Gou-Chung Chi; Chuck Wu
SOURCE: Japanese Journal of Applied Physics, Part 1 (Regular Papers, Short Notes & Review Papers) (Aug. 2004),

vol.43, no.8B, p. 5854-6, 13 refs.
CODEN: JAPNDE, ISSN: 0021-4922
SICI: 0021-4922(200408)43:8BL;5854:GM;1-B
Published by: Japan Soc. Appl. Phys, Japan

DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: Japan
LANGUAGE: English

AN 2005:8235322 INSPEC DN A2005-04-4283-008; B2005-02-4145-037

AB In this work, gratings are fabricated on the **GaN** thin film grown on the silicon substrates. **GaN membranes** are obtained by removing the silicon below the **GaN** gratings. The samples are stacked on the **GaN** diffractive microlenses on sapphire substrates fabricated using gray-level masks. The stacked components are characterized using a He-Ne laser. The laser beam is collimated by the **GaN** microlenses and diffracted by the **GaN** gratings. The result demonstrates a stacked microoptics systems in **GaN**-based materials for the first time

L2 ANSWER 98 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2004:8191372 INSPEC

DOCUMENT NUMBER: B2005-01-7230-054

TITLE: GaN based piezo sensors

AUTHOR: Neuburger, M.; Zimmermann, T.; Benkart, P.; (Dept. of Electron Devices & Circuits, Ulm Univ., Germany), Kunze, M.; Daumiller, I.; Dadgar, A.; Krost, A.; Kohn, E.

SOURCE: Device Research Conference (IEEE Cat. No.04TH8724), vol.1, 2004, p. 45-6 vol.1 of 2 vol. (xiv+247) pp., 1 refs.

ISBN: 0 7803 8284 6

Published by: IEEE, Piscataway, NJ, USA

Conference: Device Research Conference, Notre Dame, IN, USA, 21-23 June 2004

DOCUMENT TYPE: Conference; Conference Article

TREATMENT CODE: Practical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 2004:8191372 INSPEC DN B2005-01-7230-054

AB This paper presents a technology which has been developed to fabricate free-standing **GaN membrane** and cantilever structures. First experiments have enabled us to verify the piezo response of these **GaN** based cantilever structures. Especially, the bulk polarization doping generated in the base layer is a new important contribution. **GaN** heterostructures grown on 111-oriented Si wafers have been used. Free standing cantilevers and **membranes** have been fabricated using RIE and ICP dry etching. Cantilevers have been etched from the rear side or from the surface. It is expected that this technology will enable new device concepts based on stress induced pn-junction effects

L2 ANSWER 99 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2004:7929090 INSPEC

DOCUMENT NUMBER: A2004-10-0710C-055; B2004-05-2575F-137

TITLE: Development of gallium nitride-based MEMS structures

AUTHOR: Stonas, A.R.; (Dept. of Electr. & Comput. Eng., California Univ., Santa Barbara, CA, USA), Turner, K.L.; DenBaars, S.P.; Hu, E.L.

SOURCE: TRANSDUCERS '03. 12th International Conference on Solid-State Sensors, Actuators and Microsystems. Digest of Technical Papers (Cat. No.03TH8664), vol.2, 2003, p. 1156-9 vol.2 of 2 vol. (xl+xxxix+1938) pp., 11

refs., Also available on CD-ROM in PDF format
ISBN: 0 7803 7731 1
Price: 0 7803 7731 1/2003/\$17.00
Published by: IEEE, Piscataway, NJ, USA
Conference: IEEE International Solid-State Sensors and Actuators Conference, Boston, MA, USA, 8-12 June 2003
Sponsor(s): IEEE; Electron Devices Soc

DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 2004:7929090 INSPEC DN A2004-10-0710C-055; B2004-05-2575F-137
AB The fabrication of MEMS structures has generally depended on the ability to carry out highly selective, deep lateral and vertical etching of the component materials. This is particularly problematic in **gallium nitride (GaN)** and the associated AlGaN and InGaN materials, which are all noted for their chemical inertness. We report here a method for producing MEMS in this material system based on backside-illuminated photoelectrochemical (BIPEC) undercut wet etching. We also discuss resonance spectra of structures fabricated by this method, including cantilevers and **membranes**

L2 ANSWER 100 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2004:7881856 INSPEC

DOCUMENT NUMBER: A2004-07-6146-055

TITLE: Structure of assemblies of metal nanowires in mesoporous alumina membranes studied by EXAFS, XANES, X-ray diffraction and SAXS

AUTHOR: Benfield, R.E.; Grandjean, D.; Dore, J.C.; Esfahanian, H.; Zhonghua Wu; (Sch. of Phys. Sci., Univ. of Kent, Canterbury, UK), Kroll, M.; Geerkens, M.; Schmid, G.

SOURCE: Faraday Discussions (2004), no.125, p. 327-42, 72 refs.

CODEN: FDISE6, ISSN: 0301-7249

SICI: 0301-7249(2004)125L:327:SAMN;1-#

Published by: R. Soc. Chem, UK

Conference: General Discussion on Nanoparticle Assemblies, Liverpool, UK, 14-16 July 2003

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: General Review; Experimental

COUNTRY: United Kingdom

LANGUAGE: English

AN 2004:7881856 INSPEC DN A2004-07-6146-055

AB Mesoporous alumina **membranes** ('anodic aluminium oxide', or 'AAO') are made by anodic oxidation of aluminium metal. These **membranes** contain hexagonal arrays of parallel non-intersecting cylindrical pores perpendicular to the **membrane** surface. By varying the anodisation voltage, the pore diameters are controllable within the range 5-250 nm. We have used AAO **membranes** as templates for the electrochemical deposition of metals within the pores to produce nanowires. These represent assemblies of one-dimensional quantum wires with prospective applications in electronic, optoelectronic and magnetic devices. Detailed characterisation of the structures of these nanowire assemblies over a variety of length scales is essential to understand their physical properties and evaluate their possible applications. We have used EXAFS, XANES, WAXS, high energy X-ray diffraction and SAXS to study their structure and bonding. In this paper we report the results of our studies of four different nanowire systems supported in AAO **membranes**. These are the ferromagnetic metals iron and cobalt, the superconducting metal tin, and the semiconductor **gallium nitride**. Iron nanowires in pores of diameter over the range 12 nm-72 nm are structurally very similar to bcc bulk

iron. They have a strong preferred orientation within the alumina pores. Their XANES shows significant differences from that of bulk iron, showing that the electronic structure of the iron nanowires depends systematically on their diameter. Cobalt nanowires are composed of a mixture of hcp and fcc phases, but the ratio of the two phases does not depend in a simple way on the pore diameter or preparation conditions. In bulk cobalt, the fcc 2-phase is normally stable only at high temperatures. Strong preferred orientation of the c-axis in the pores was found. Tin nanowires in alumina **membranes** with pores diameters between 12 nm and 72 nm have a tetragonal 2-structure at ambient temperature and also at 80 K. Magnetic susceptibility measurements show that they are diamagnetic, and become superconducting at the same temperature as bulk tin (3.7 K), **Gallium nitride** nanowires have been prepared in alumina **membranes** with pore diameter 24 nm by a novel method. Gallium nitrate was deposited in the pores from aqueous solution and thermolysed at 1000°C to form Ga₂O₃, which was reacted with ammonia at 1000°C. The **GaN** nanowires have the wurtzite structure. Preparation at 1150°C led to the incorporation of aluminium in the **GaN**. The mesoscopic ordering of the pores in the AAO **membranes** and their filling by metal nanowires has been studied by SAXS, which shows patterns of Bragg peaks arising from the pore arrays. Additionally, the cobalt nanowires have been the subject of an initial ASAXS study

L2 ANSWER 101 OF 124 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2004:7856897 INSPEC
 DOCUMENT NUMBER: A2004-06-8780B-010; B2004-03-7230J-022
 TITLE: AlxGa1-xN-a new material system for biosensors
 AUTHOR: Steinhoff, G.; (Walter Schottky Inst., Tech. Univ. Munich, Garching, Germany), Purucker, O.; Tanaka, M.; Stutzmann, M.; Eickhoff, M.
 SOURCE: Advanced Functional Materials (Nov. 2003), vol.13, no.11, p. 841-6, 43 refs.
 CODEN: AFMDC6, ISSN: 1616-301X
 SICI: 1616-301X(200311)13:11L:841:AMSB;1-X
 Published by: Wiley-VCH, Germany
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Practical; Experimental
 COUNTRY: Germany
 LANGUAGE: English
 AN 2004:7856897 INSPEC DN A2004-06-8780B-010; B2004-03-7230J-022
 AB The applicability of the group III nitride material system for the fabrication of semiconductor-based biosensors is demonstrated. The operation of ion-sensitive field-effect transistors (ISFETs) based on AlGa_N/**GaN** heterostructures in aqueous electrolytes is shown to be characterized by high sensitivity and low drift. Fibroblasts in contact with oxidized and as-deposited AlGa_N surfaces are demonstrated to survive at least for 24 h, indicating that these surfaces are chemically robust and non-toxic against living cells. Surface hydrophilization using thermal oxidation allows the deposition of highly mobile lipid **membranes** by vesicle fusion. The homogeneity and the diffusion properties of phospholipids with different net charges were analyzed by fluorescence microscopy and constant photobleaching, taking advantage of the optical transparency of the AlGa_N material system. The obtained results reveal that AlGa_N-based devices are promising candidates for future multifunctional biosensors

L2 ANSWER 102 OF 124 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2004:7852373 INSPEC
 DOCUMENT NUMBER: A2004-05-2940-001; B2004-03-7230C-032
 TITLE: Characterization of GaN based Schottky UV detectors in the vacuum UV (VUV) and the soft X-ray (SX) region

(10-100 nm)
AUTHOR: Motogaito, A.; Watanabe, H.; Hiramatsu, K.; (Dept. of Electr. & Electron. Eng., Mie Univ., Tsu, Japan), Fukui, K.; Hamamura, Y.; Tadatomo, K.
SOURCE: Physica Status Solidi A (Nov. 2003), vol.200, no.1, p. 147-50, 17 refs.
CODEN: PSSABA, ISSN: 0031-8965
SICI: 0031-8965(200311)200:1L.147:CBSD;1-X
Published by: Wiley-VCH, Germany
Conference: 5th International Conference on Nitride Semiconductors (ICNS-5), Nara, Japan, 25-30 May 2003
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: Germany
LANGUAGE: English

AN 2004:7852373 INSPEC DN A2004-05-2940-001; B2004-03-7230C-032
AB Responsivity spectra of **GaN** based Schottky type ultraviolet (UV) photodetectors with transparent electrode from the Vacuum Ultraviolet (VUV) region to soft X-ray (SX) region (10-100 nm, 124-12.4 eV) are described for the first time. The calculated transmittance of 10 nm-thick transparent Ni/Au electrode from the transmittance of Ti/Au **membrane** is about 0.5-0.7 in the VUV and SX region (10-100 eV). Thus it is considered that the 10-nm-transparent Ni/Au electrode is thin enough to transmit VUV and SX light into the transparent electrode. The value of responsivity in the SX region (at 13 nm) is about 0.05 A/W

L2 ANSWER 103 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2003:7742488 INSPEC
DOCUMENT NUMBER: A2003-21-6865-041; B2003-11-2550N-011
TITLE: Non-lithographic fabrication of large scale highly ordered semiconductor nanowire and nanodot arrays
AUTHOR: Liang Jianyu; Chik, H.; Xu, J. (Div. of Eng., Brown Univ., Providence, RI, USA)
SOURCE: 7th International Conference on Nanometer-Scale Science and Technology and 21st European Conference on Surface Science, 2002, p. 2 pp. of CD-ROM pp., 1 refs.
Published by: Lund Univ, Lund, Sweden
Conference: Proceedings of 7th International Conference on Nanometer-Scale Science and Technology and 21st European Conference on Surface Science (NANO-7/ECOSS-21), Malmo, Sweden, 24-28 June 2002
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: Sweden
LANGUAGE: English

AN 2003:7742488 INSPEC DN A2003-21-6865-041; B2003-11-2550N-011
AB Uniform, hexagonally ordered semiconductor nanowire and nanodot arrays were fabricated utilizing a thin anodic aluminum oxide **membrane** with densely packed straight nanochannels as a template. Nano Si, GaAs, and **GaN** dot and wire array with an aspect ratio from 1 to 8 was achieved with homogenous etch depth, smooth etch surface, and nearly vertical sidewalls. The diameter of the nanowires, which can be controlled in the formation of the template, can be altered with a standard deviation of less than 5% from the mean diameter

L2 ANSWER 104 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2003:7726683 INSPEC
DOCUMENT NUMBER: A2003-20-8115G-051; B2003-10-2520D-033
TITLE: Nanoheteroepitaxy of GaN on a nanopore array Si surface
AUTHOR: Liang, J.; Hong, S.-K.; Kouklin, N.; Beresford, R.; Xu, J.M. (Div. of Eng., Brown Univ., Providence, RI,

USA)

SOURCE: Applied Physics Letters (1 Sept. 2003), vol.83, no.9, p. 1752-4, 14 refs.
 CODEN: APPLAB, ISSN: 0003-6951
 SICI: 0003-6951(20030901)83:9L:1752:NNAS;1-2
 Price: 01/03/6951/2003/83(9)/1752(3)/\$20.00
 Doc.No.: S0003-6951(03)02034-5
 Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Application; Experimental

COUNTRY: United States

LANGUAGE: English

AN 2003:7726683 INSPEC DN A2003-20-8115G-051; B2003-10-2520D-033

AB We report the growth by molecular beam epitaxy and the optical characterization of **GaN** films nucleated on a Si(111) surface that has been patterned by dry etching an ordered array of nanometer-scale pores prior to the growth. The etching is performed using an anodized aluminum oxide **membrane** as a mask. The nanopore array surface with the pore diameter of 60 nm and periodicity of 110 nm exhibits significant effects on emissivity and the optical properties of the resulting film. Room-temperature photoluminescence intensity increases by a factor of 5 for **GaN** grown on nanoporous Si. Peak shifts in photoluminescence and Raman spectroscopy suggest that the material grown on nanopores may be more relaxed than films grown on flat substrates. The effects of nanopore topography on the nucleation of **GaN** films offer a potential path to significant improvement of III-nitride heteroepitaxy for device applications

L2 ANSWER 105 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7606983 INSPEC

DOCUMENT NUMBER: B2003-06-4260D-010

TITLE: Microcavity light emitting diodes based on **GaN membranes** grown by molecular beam epitaxy on silicon

AUTHOR: Duboz, J.-Y.; De L'Isle, N.B.; Dua, L.; Legagneux, P.; Mosca, M.; Reverchon, J.-L.; (Thales Res. & Technol., Orsay, France), Damilano, B.; Grandjean, N.; Semond, F.; Massies, J.; Dudek, R.; Poitras, D.; Cassidy, T.

SOURCE: Japanese Journal of Applied Physics, Part 1 (Regular Papers, Short Notes & Review Papers) (Jan. 2003), vol.42, no.1, p. 118-21, 17 refs.
 CODEN: JAPNDE, ISSN: 0021-4922
 SICI: 0021-4922(200301)42:1L:118:MLED;1-F
 Published by: Japan Soc. Appl. Phys., Japan

DOCUMENT TYPE: Journal

TREATMENT CODE: Practical

COUNTRY: Japan

LANGUAGE: English

AN 2003:7606983 INSPEC DN B2003-06-4260D-010

AB Resonant-cavity InGaN/**GaN** quantum well light emitting diodes have been fabricated. Nitride layers were grown by molecular beam epitaxy on Si (111). We fabricated the structures using a combination of Si substrate etching, **GaN** etching and dielectric (Ta2O5/SiO2) mirror deposition. The electroluminescence spectra show that the emission within the distributed Bragg reflector stop band is enhanced in the **membrane** microcavity. The cavity modes are broadened by some cavity length non-uniformity that is introduced when the **GaN** is back etched to adjust the cavity length. This process does not need any transfer on an intermediate host substrate and is fully compatible with large area semiconductor processing

L2 ANSWER 106 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2002:7384033 INSPEC
DOCUMENT NUMBER: A2002-21-6146-026
TITLE: Morphology and Raman scattering spectrum of GaN nanowires embedded in nanochannels of template
AUTHOR: Jun Zhang; Lide Zhang (Dept. of Phys., Yantai Univ., China)
SOURCE: Journal of Physics D (Applied Physics) (7 July 2002), vol.35, no.13, p. 1481-5, 26 refs.
CODEN: JPAPBE, ISSN: 0022-3727
SICI: 0022-3727(20020707)35:13L:1481:MRSS;1-Q
Price: 0022-3727/02/131481+05\$30.00
Doc.No.: S0022-3727(02)34344-4
Published by: IOP Publishing, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United Kingdom
LANGUAGE: English

AN 2002:7384033 INSPEC DN A2002-21-6146-026

AB The hexagonal wurtzite **GaN** nanowires embedded in the nanochannels of anodic alumina **membrane** were achieved by the direct reaction of Ga vapour with a constant flowing ammonia atmosphere. X-ray diffraction (XRD), scanning electron microscopy and transmission electron microscopy were used to measure the size and structures of the samples. The Raman scattering spectrum of ordered **GaN** nanowires was studied. The Raman spectrum of the **GaN** nanowire arrays is consistent with the hexagonal wurtzite structure **GaN**, in agreement with XRD observation. The E2(high), E1 (TO), and A1 (TO) phonon frequencies at 563, 553, and 529 cm⁻¹ show the low-energy shifts, respectively. The shifts and band broadening of the Raman modes result from the nanosize effect

L2 ANSWER 107 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2002:7353348 INSPEC
DOCUMENT NUMBER: A2002-19-4255P-005; B2002-09-4320J-043
TITLE: CW InGaN multiple-quantum-well laser diodes on copper and diamond substrates by laser lift-off
AUTHOR: Kneissl, M.; Wong, W.S.; Treat, D.W.; Teepe, M.; Miyashita, N.; Johnson, N.M. (Electron. Mater. Lab., Xerox Palo Alto Res. Center, CA, USA)
SOURCE: Materials Science & Engineering B (Solid-State Materials for Advanced Technology) (30 May 2002), vol.B93, p. 68-72, 12 refs.
CODEN: MSBTEK, ISSN: 0921-5107
SICI: 0921-5107(20020530)B93L:68:IMQW;1-F
Price: 0921-5107/02/\$22.00
Doc.No.: S0921-5107(02)00041-7
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English

AN 2002:7353348 INSPEC DN A2002-19-4255P-005; B2002-09-4320J-043

AB Continuous-wave (cw) InGaN multiple-quantum-well laser diodes grown on sapphire substrates by metalorganic chemical vapor deposition were successfully transferred onto copper and diamond using excimer laser lift-off. Room-temperature cw threshold currents as low as 87 mA with threshold voltages of 5.8 V were obtained for laser diodes on diamond substrates. **GaN**-based laser structures transferred onto Cu substrates show a significantly reduced thermal resistance resulting in a more than 2 + increase in cw output power of more than 100 mW. High-quality cleaved facets have been obtained for free-standing **GaN** laser **membranes** after sapphire substrate removal

L2 ANSWER 108 OF 124 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2002:7165288 INSPEC
 DOCUMENT NUMBER: B2002-03-2550N-003
 TITLE: Two-dimensional lateral superlattices of nanostructures: Nonlithographic formation by anodic membrane template
 AUTHOR: Jianyu Liang; Chik, H.; Yin, A.; Jimmy Xu (Div. of Eng., Brown Univ., Providence, RI, USA)
 SOURCE: Journal of Applied Physics (15 Feb. 2002), vol.91, no.4, p. 2544-6, 10 refs.
 CODEN: JAPIAU, ISSN: 0021-8979
 SICI: 0021-8979(20020215)91:4L:2544:DLSN;1-B
 Price: 0021-8979/2002/91(4)/2544(3)/\$19.00
 Doc.No.: S0021-8979(02)06304-1
 Published by: AIP, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Practical; Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 2002:7165288 INSPEC DN B2002-03-2550N-003
 AB A nonlithographic technique that utilizes highly ordered anodized aluminum oxide porous **membrane** as template is presented as a general fabrication means for the formation of an array of vastly different two-dimensional lateral superlattices structures. Hexagonal close-packed nanopore arrays were fabricated on Si, GaAs, and **GaN** substrates via reactive ion etching. Quantum dot arrays of various metals and semiconductors were formed through evaporation and subsequent etching. The two-dimensional lateral superlattice structures fabricated using this method are of a high level of ordering, uniformity, and packing density. The diameter and periodicity of the nanostructures are determined by the features of the original alumina **membrane**, which can be adjusted by varying the anodization conditions

L2 ANSWER 109 OF 124 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2002:7159958 INSPEC
 DOCUMENT NUMBER: A2002-05-4255P-020; B2002-02-4320J-098
 TITLE: CW InGaN multiple-quantum-well laser diodes on copper substrates
 AUTHOR: Kneissl, M.; Wong, W.S.; Treat, D.W.; Teepe, M.; Miyashita, N.; Johnson, N.M. (Electron. Mater. Lab., Xerox Palo Alto Res. Center, CA, USA)
 SOURCE: Physica Status Solidi A (16 Nov. 2001), vol.188, no.1, p. 23-9, 14 refs.
 CODEN: PSSABA, ISSN: 0031-8965
 SICI: 0031-8965(20011116)188:1L:23:IMQW;1-2
 Price: 0031-8965/01/18811-0023\$17.50+.50/0
 Published by: Wiley-VCH, Germany
 Conference: Fourth International Conference on Nitride Semiconductors, Denver, CO, USA, 16-20 July 2001
 DOCUMENT TYPE: Conference; Conference Article; Journal
 TREATMENT CODE: Experimental
 COUNTRY: Germany
 LANGUAGE: English
 AN 2002:7159958 INSPEC DN A2002-05-4255P-020; B2002-02-4320J-098
 AB Continuous-wave (CW) InGaN multiple-quantum-well laser diodes grown on sapphire substrates by metalorganic chemical vapor deposition (MOCVD) were successfully transferred onto copper using an excimer laser lift-off technique. For the laser diodes on copper substrates improved device performance was observed with room-temperature CW threshold currents as low as 68 mA and threshold voltages of 5.9 V. Differential quantum efficiencies of 0.7 W/A were obtained with a laser emission wavelength

near 400 nm. GaN-based laser structures transferred onto copper substrates show a significantly reduced thermal resistance resulting in a more than twofold increase in CW output power to more than 100 W. High quality cleaved facets have been obtained for freestanding GaN laser membranes after sapphire substrate removal

L2 ANSWER 110 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7138913 INSPEC
DOCUMENT NUMBER: B2002-02-3240R-002
TITLE: Fabrication of a superconducting hot-electron bolometer receiver with micromachined waveguide components
AUTHOR: Datesman, A.M.; Zhang, J.Z.; Lichtenberger, A.W.; (Dept. of Electr. & Comput. Eng., Virginia Univ., Charlottesville, VA, USA), Walker, C.
SOURCE: Proceedings of the Fourteenth Biennial University/Government/Industry Microelectronics Symposium (Cat. No.01CH37197), 2001, p. 186-9 of 225 pp., 4 refs.
ISBN: 0 7803 6691 3
Price: 0 7803 6691 3/2001/\$10.00
Published by: IEEE, Piscataway, NJ, USA
Conference: Proceedings of the Fourteenth Biennial University/Government/Industry Microelectronics Symposium, Richmond, VA, USA, 17-20 June 2001
Sponsor(s): IEEE Electron Devices Soc.; Virginia Commonwealth Univ. School of Eng.; Virginia Commonwealth Univ. School of Eng.; Virginia Econ. Dev. Partnership; Virginia's Center for Innovative Technol.; Greater Richmond Partnership
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2002:7138913 INSPEC DN B2002-02-3240R-002
AB The use of superconducting hot-electron bolometers (HEBs) as mixing elements in terahertz heterodyne receivers has become increasingly attractive in the last few years. Such receivers find application in the fields of radio astronomy, molecular spectroscopy, and atmospheric remote sensing. We have developed a method of fabricating these devices, consisting of a niobium film less than one-quarter micron long and 150 Å thick, using a gallium focused-ion beam (FIB). We intend to build a mixer which incorporates these devices, fabricated on silicon nitride membranes, with terahertz waveguide components fabricated by laser-micromachining of silicon under CAD control. This paper discusses the three fabrication methods (focused-ion beam, the bulk micromachining of silicon necessary to obtain nitride membranes, and laser micromachining) used in our work

L2 ANSWER 111 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:7102978 INSPEC
DOCUMENT NUMBER: A2002-01-7855-046
TITLE: Fabrication and photoluminescence of ordered GaN nanowire arrays
AUTHOR: Zhang, J.; (Inst. of Solid State Phys., Chinese Acad. of Sci., Hefei, China), Zhang, L.D.; Wang, X.F.; Liang, C.H.; Peng, X.S.; Wang, Y.W.
SOURCE: Journal of Chemical Physics (1 Oct. 2001), vol.115, no.13, p. 5714-17, 28 refs.
CODEN: JCPSA6, ISSN: 0021-9606
SICI: 0021-9606(20011001)115:13L:5714:FPON;1-8
Price: 0021-9606/2001/115(13)/5714(4)/\$18.00

Doc.No.: S0021-9606(01)71637-6

Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2001:7102978 INSPEC DN A2002-01-7855-046

AB Large-scale of crystalline **GaN** nanowires (diameter 50 nm) have been fabricated through chemical-vapor deposition in the nanochannels of the anodic alumina template. X-ray diffraction and selected area electron diffraction pattern investigations indicate that the nanowires are single crystal with hexagonal wurtzite structure. A typical scanning electron microscopy image and the energy dispersive X-ray spectroscopy results indicate that indium nanoparticles only act as catalyst in **GaN** nanowires growth. At room temperature, photoluminescence spectrum of the **GaN** nanowire arrays shows a visible broadband with three peaks, which are located at about 363, 442, and 544 nm. The light emission may be attributed to **GaN** band-edge emission, the existence of defects or surface states, and the interaction between the ordered **GaN** nanowires and anodic alumina **membrane**. The growth mechanism of crystalline **GaN** nanowires is discussed. The method makes it possible to synthesize other nitride nanowire arrays

L2 ANSWER 112 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2001:7088002 INSPEC

DOCUMENT NUMBER: A2001-24-7830-004

TITLE: Micro-Raman investigation of GaN nanowires prepared by direct reaction Ga with NH₃

AUTHOR: Zhang, J.; Peng, X.S.; Wang, X.F.; Wang, Y.W.; Zhang, L.D. (Inst. of Solid State Phys., Acad. Sinica, Hefei, China)

SOURCE: Chemical Physics Letters (21 Sept. 2001), vol.345, no.5-6, p. 372-6, 21 refs.

CODEN: CHPLBC, ISSN: 0009-2614

SICI: 0009-2614(20010921)345:5/6L.372:MRIN;1-2

Price: 0009-2614/01/\$20.00

Doc.No.: S0009-2614(01)00905-8

Published by: Elsevier, Netherlands

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Netherlands
LANGUAGE: English

AN 2001:7088002 INSPEC DN A2001-24-7830-004

AB Ordered crystalline **GaN** nanowires embedded in the nanochannels of anodic alumina **membrane** (AAM) were achieved by direct reaction of Ga with NH₃. The impact of reaction temperatures on Raman spectroscopic properties of **GaN** nanowires is investigated. X-ray diffraction and transmission electron microscopy (TEM) observations demonstrate that the crystalline **GaN** nanowires have hexagonal wurtzite structure. The hexagonal wurtzite structure **GaN** nanowires prepared at 960°C are about 40 nm in diameter and up to several hundreds of micrometers in length

L2 ANSWER 113 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2001:6862319 INSPEC

DOCUMENT NUMBER: B2001-04-1350F-052

TITLE: AlGaIn/GaN high electron mobility transistors on Si(111) substrates

AUTHOR: Chumbes, E.M.; Schremer, A.T.; Smart, J.A.; Wang, Y.; (Sch. of Electr. Eng., Cornell Univ., Ithaca, NY, USA), MacDonald, N.C.; Hogue, D.; Komiak, J.J.; Lichwalla, S.J.; Leoni, R.E. III.; Shealy, J.R.

SOURCE: IEEE Transactions on Electron Devices (March 2001),
vol.48, no.3, p. 420-6, 25 refs.
CODEN: IETDAI, ISSN: 0018-9383
SICI: 0018-9383(200103)48:3L:420:AHM;1-4
Price: 0018-9383/2001/\$10.00
Doc.No.: S0018-9383(01)01447-2
Published by: IEEE, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 2001:6862319 INSPEC DN B2001-04-1350F-052
AB AlGaIn/GaN high electron mobility transistors (HEMTs) on silicon substrates have for the first time been realized using organometallic vapor phase epitaxy (OMVPE). Using 1 Ω -cm p-Si(111), these devices exhibited static output characteristics with low output conductance and isolation approaching 80 V. Under microwave rf operation, the substrate charge becomes capacitively coupled and parasitically loads these devices thereby limiting their performance. As a result, typical 0.3 μ m gate length devices show a 25 GHz cutoff frequency, with near unity f_{max}/f_T ratio and 0.55 W/mm output power. A small-signal equivalent circuit incorporating elements representing the parasitic substrate loading accurately models the measured S-parameters. Removal of the conductive substrate is one way to effectively eliminate this parasitic loading. Through backside processing, freestanding 0.4-mm HEMT **membranes** with no thermal management were demonstrated and exhibited a significant improvement in their f_{max}/f_T ratio up to 2.5 at the cost of lower f_T and f_{max} along with an almost four-fold reduction of I_{dss}

L2 ANSWER 114 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6694424 INSPEC
DOCUMENT NUMBER: A2000-20-6865-022; B2000-10-0520F-068
TITLE: Highly ordered nanostructures of single crystalline GaIn nanowires in anodic alumina **membranes**

AUTHOR: Cheng, G.S.; Chen, S.H.; Zhu, X.G.; (Inst. of Solid State Phys., Acad. Sinica, Hefei, China), Mao, Y.Q.; Zhang, L.D.

SOURCE: Materials Science & Engineering A (Structural Materials: Properties, Microstructure and Processing) (30 June 2000), vol.A286, no.1, p. 165-8, 18 refs.
CODEN: MSAPE3, ISSN: 0921-5093
SICI: 0921-5093(20000630)A286:1L:165:HONS;1-0
Price: 0921-5093/2000/\$20.00
Doc.No.: S0921-5093(00)00630-4
Published by: Elsevier, Switzerland
Conference: Symposium A-Nanostructured Materials, The Fifth IUMRS International Conference on Advanced Materials (ICAM '99), Beijing, China, 13-18 June 1999

DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English

AN 2000:6694424 INSPEC DN A2000-20-6865-022; B2000-10-0520F-068
AB Synthesis of highly ordered nanostructures of single crystalline GaIn nanowires in anodic alumina **membranes** was achieved through a gas reaction of Ga₂O₃ vapor with a constant ammonia atmosphere at 1000°C in the presence of nano-sized metallic indium catalysis. Atomic force microscopy, X-ray diffraction, Raman backscattering spectrum, scanning electron microscopy, and transmission electron microscopy indicate that the ordered nanostructure consists of the single crystalline hexagonal wurtzite GaIn nanowires with about 20 nm

in diameter and 40 50 μm in length in the uniform nanochannels of the anodic alumina **membrane**. The vapor-liquid-solid (VLS) growth mechanism of the ordered nanostructure was discussed in detail

L2 ANSWER 115 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1999:6415866 INSPEC
DOCUMENT NUMBER: A2000-01-8115I-014; B2000-01-0520H-009
TITLE: Selective UV-laser processing for lift-off of GaN thin films from sapphire substrates
AUTHOR: Wong, W.S.; Kruger, J.; Cho, Y.; (Dept. of Mater. Sci. & Miner. Eng., California Univ., Berkeley, CA, USA), Linder, B.P.; Weber, E.R.; Cheung, N.W.; Sands, T.
SOURCE: Proceedings of the Symposium on Light Emitting Devices for Optoelectronic Applications and Twenty-Eighth State-of-the-Art Program on Compound Semiconductors, 1998, p. 377-84 of xi+642 pp., 22 refs.
Editor(s): Hou, H.Q.; Sah, R.E.; Pearton, S.J.; Ren, F.; Wada, K.
ISBN: 1 56677 194 3
Published by: Electrochem. Soc, Pennington, NJ, USA
Conference: Proceedings of the Symposium on Light Emitting Devices for Optoelectronic Applications and Twenty-Eighth State-of-the-Art Program on Compound Semiconductors, San Diego, CA, USA, 3-8 May 1998
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 1999:6415866 INSPEC DN A2000-01-8115I-014; B2000-01-0520H-009
AB **Gallium nitride (GaN)** thin films on sapphire substrates were successfully separated and transferred on to Si substrates by pulsed UV-laser processing. A single 600 mJ/cm², 38 ns KrF excimer laser pulse was directed through the transparent substrate to induce a rapid thermal decomposition of the **GaN** at the **GaN/sapphire** interface. The decomposition yields metallic Ga and N₂ gas that allows separation of the **GaN** film from the substrate. 3 μm -thick free-standing **GaN membranes** were also fabricated using the laser lift-off technique. Surface roughness of the exposed interfacial layer was measured to be 24 nm (RMS) by atomic force microscopy. Photoluminescence measurements of the **GaN membranes** showed no optical degradation of the **GaN** after lift-off from the sapphire. Based on a 10 meV blue-shift of the donor-bound exciton peak, an estimated biaxial compressive stress of 0.4 GPa in the **GaN** film was relieved by separation from the sapphire growth substrate

L2 ANSWER 116 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1999:6406299 INSPEC
DOCUMENT NUMBER: B1999-12-4145-013
TITLE: GaN and related compounds for MEMS and MOEMS
AUTHOR: Krawczyk, S.K.; Someya, T.; Arakawa, Y.; Fujita, H. (Inst. of Ind. Sci., Tokyo Univ., Japan)
SOURCE: Seisan Kenkyu (1999), vol.51, no.8, p. 2-5, 7 refs.
CODEN: SEKEAI, ISSN: 0037-105X
SICI: 0037-105X(1999)51:8L.2:RCMM;1-9
Published by: Univ. Tokyo, Japan
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Japan
LANGUAGE: English
AN 1999:6406299 INSPEC DN B1999-12-4145-013

AB The detailed aims of this project are to build-up few demonstrator devices exploring both vertical and planar active/passive UV **GaN** optical components integrated with mechanical components. These include the following MOEMS: 1) Tunable light sources and detectors for UV spectroscopy and high temperature operation based on **GaN** photo-detectors, LEDs and VCSELs integrated with electrically controlled vertical air-gap Fabry-Perot optical filters. 2) Pressure, acceleration and vibration sensors, which make use of active **GaN** optoelectronic devices, planar **GaN** optical guides and Mach-Zehnder interferometers located over a **membrane** or close to a cantilever

L2 ANSWER 117 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1999:6391503 INSPEC

DOCUMENT NUMBER: A1999-23-6865-023; B1999-12-2550N-003

TITLE: Large-scale synthesis of single crystalline gallium nitride nanowires

AUTHOR: Cheng, G.S.; Zhang, L.D.; Zhu, Y.; Fei, G.T.; Li, L.; (Inst. of Solid State Phys., Acad. Sinica, Hefei, China), Mo, C.M.; Mao, Y.Q.

SOURCE: Applied Physics Letters (18 Oct. 1999), vol.75, no.16, p. 2455-7, 17 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(19991018)75:16L.2455:LSSS;1-G

Price: 0003-6951/99/75(16)/2455(3)/\$15.00

Doc.No.: S0003-6951(99)05342-5

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Practical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 1999:6391503 INSPEC DN A1999-23-6865-023; B1999-12-2550N-003

AB Large-scale synthesis of single crystalline **GaN** nanowires in anodic alumina **membrane** was achieved through a gas reaction of Ga₂O vapor with a constant flowing ammonia atmosphere at 1273 K. X-ray diffraction, Raman backscattering spectroscopy, scanning electron microscopy, and transmission electron microscopy indicated that those **GaN** nanowires with hexagonal wurtzite structure were about 14 nm in diameter and up to several hundreds of micrometers in length. The growth mechanism of the single crystalline **GaN** nanowires is discussed

L2 ANSWER 118 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1999:6363071 INSPEC

DOCUMENT NUMBER: A1999-21-8115-002

TITLE: Synthesis of orderly nanostructure of crystalline **GaN** nanoparticles on anodic porous alumina **membrane**

AUTHOR: Cheng, G.S.; Zhang, L.D.; Zhu, X.G.; Chen, S.H.; Li, Y.; Zhu, Y.; Fei, G.T. (Inst. of Solid State Phys., Acad. Sinica, Hefei, China)

SOURCE: Nanostructured Materials (1999), vol.11, no.3, p. 421-6, 17 refs.

CODEN: NMAEE7, ISSN: 0965-9773

SICI: 0965-9773(1999)11:3L.421:SONC;1-D

Price: 0965-9773/99/\$20.00

Doc.No.: S0965-9773(99)00322-0

Published by: Elsevier, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 1999:6363071 INSPEC DN A1999-21-8115-002
AB Synthesis of an orderly nanostructure of crystalline **GaN** nanoparticles on anodic porous alumina **membrane** through a gas reaction of Ga₂O vapor with a constant ammonia atmosphere at 900°C was achieved. The investigation using atomic force microscopy, X-ray diffraction, transmission electron microscopy and high resolution electron microscopy indicated that the orderly nanostructure consisted of polycrystalline **GaN** nanoparticles with a hexagonal wurtzite structure and about 10-20 nm in diameter. The growth mechanism of the orderly nanostructure of the **GaN** nanoparticles was discussed. The photoluminescence spectrum of the orderly nanostructure was also reported

L2 ANSWER 119 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1999:6353087 INSPEC
DOCUMENT NUMBER: B1999-10-4260D-089
TITLE: Fabrication of thin-film InGaN light-emitting diode membranes by laser lift-off
AUTHOR: Wong, W.S.; Sands, T.; (Dept. of Mater. Sci. & Miner. Eng., California Univ., Berkeley, CA, USA), Cheung, N.W.; Kneissl, M.; Bour, D.P.; Mei, P.; Romano, L.T.; Johnson, N.M.
SOURCE: Applied Physics Letters (6 Sept. 1999), vol.75, no.10, p. 1360-2, 19 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(19990906)75:10L:1360:FTFI;1-P
Price: 0003-6951/99/75(10)/1360(3)/\$15.00
Doc.No.: S0003-6951(99)02636-4
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 1999:6353087 INSPEC DN B1999-10-4260D-089
AB Indium-**gallium nitride** (InGaN) multiple-quantum-well (MQW) light-emitting diode (LED) **membranes**, prefabricated on sapphire growth substrates, were created using pulsed-excimer laser processing. The thin-film InGaN MQW LED structures, grown on sapphire substrates, were first bonded onto a Si support substrate with an ethyl cyanoacrylate-based adhesive. A single 600 mJ/cm², 38 ns KrF (248 nm) excimer laser pulse was directed through the transparent sapphire, followed by a low-temperature heat treatment to remove the substrate. Free-standing InGaN LED **membranes** were then fabricated by immersing the InGaN LED/adhesive/Si structure in acetone to release the device from the supporting Si substrate. The current-voltage characteristics and room-temperature emission spectrum of the LEDs before and after laser lift-off were unchanged

L2 ANSWER 120 OF 124 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1999:6158331 INSPEC
DOCUMENT NUMBER: A1999-06-7320A-001; B1999-03-2520D-031
TITLE: Reduction of the energy gap pressure coefficient of GaN due to the constraining presence of the sapphire substrate
AUTHOR: Perlin, P.; Mattos, L.; Shapiro, N.A.; Kruger, J.; (California Univ., Berkeley, CA, USA), Wong, W.S.; Sands, T.; Cheung, N.W.; Weber, E.R.
SOURCE: Journal of Applied Physics (15 Feb. 1999), vol.85, no.4, p. 2385-9, 20 refs.
CODEN: JAPIAU, ISSN: 0021-8979
SICI: 0021-8979(19990215)85:4L:2385:REPC;1-I
Price: 0021-8979/99/85(4)/2385(5)/\$15.00

Doc.No.: S0021-8979(99)06803-6

Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 1999:6158331 INSPEC DN A1999-06-7320A-001; B1999-03-2520D-031

AB We have performed a detailed investigation of the photoluminescence pressure dependence of heteroepitaxial **GaN** thin films on sapphire substrates. A comparison between as grown **GaN** on sapphire and free-standing **GaN membranes**, created using a laser assisted substrate liftoff process, revealed that the presence of the sapphire substrate leads to an energy gap pressure coefficient reduction of approximately 5%. This result agrees with the numerical simulations presented in this article. We established that the linear pressure coefficient of free-standing **GaN** is 41.4 ± 0.2 meV/GPa, and that the deformation potential of the energy gap is -9.36 ± 0.04 eV. Our results also suggest a new, lower value of the pressure derivative for the bulk modulus of **GaN** ($B'=3.5$)

L2 ANSWER 121 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1997:5473767 INSPEC

DOCUMENT NUMBER: A1997-04-8720-004

TITLE: Optical changes in unilamellar vesicles experiencing osmotic stress

AUTHOR: White, G.; Pencer, J.; Nickel, B.G.; (Dept. of Phys., Guelph Univ., Ont., Canada), Wood, J.M.; Hallett, F.R.

SOURCE: Biophysical Journal (Nov. 1996), vol.71, no.5, p. 2701-15, 46 refs.

CODEN: BIOJAU, ISSN: 0006-3495

SICI: 0006-3495(199611)71:5L:2701:OCUV;1-G

Price: 0006-3495/96/11/2701/15\$2.00

Published by: Biophys. Soc, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 1997:5473767 INSPEC DN A1997-04-8720-004

AB **Membrane** properties that vary as a result of isotropic and transmembrane osmolality variations (osmotic stress) are of considerable relevance to mechanisms such as osmoregulation, in which a biological system "senses" and responds to changes in the osmotic environment. In this paper the light-scattering behaviour of a model system consisting of large unilamellar vesicles of dioleoyl phosphatidyl glycerol (DOPG) is examined as a function of their osmotic environment. Osmotic downshifts lead to marked reductions in the scattered intensity, whereas osmotic upshifts lead to strong intensity increases. It is shown that these changes in the scattering intensity involve changes in the refractive index of the **membrane** bilayer that result from an alteration in the extent of hydration and/or the phospholipid packing density. By considering the energetics of osmotically stressed vesicles, and from explicit analysis of the Rayleigh-**Gans**-Debye scattering factors for spherical and ellipsoidal shells, we quantitatively demonstrate that although changes in vesicle volume and shape can arise in response to the imposition of osmotic stress, these factors alone cannot account for the observed changes in scattered intensity

L2 ANSWER 122 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1996:5223845 INSPEC

DOCUMENT NUMBER: A1996-09-8725-007

TITLE: The spatial variation of the refractive index in biological cells

AUTHOR: Beuthan, J.; Minet, O.; (Inst. for Med.-Technical
Phys. & Laser Med., Freie Univ. Berlin, Germany),
Helfmann, J.; Herrig, M.; Muller, G.
SOURCE: Physics in Medicine and Biology (March 1996), vol.41,
no.3, p. 369-82, 17 refs.
CODEN: PHMBA7, ISSN: 0031-9155
SICI: 0031-9155(199603)41:3L:369:SVRI;1-6
Price: 0031-9155/96/030369+14\$19.50
Published by: IOP Publishing, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United Kingdom
LANGUAGE: English

AN 1996:5223845 INSPEC DN A1996-09-8725-007

AB With a phase microscope the phase shift of cells from type L 929
fibroblasts and mitochondria from liver cells was measured. Compared to
the total phase shift caused by the cell relative to vacuum
(approximately 1400 nm) the single phase shift of the mitochondria
(approximately 180 nm) is small. Only the nucleus and the
membrane of the cell give a visibly different phase shift
relative to the mean value of the cell. The Fraunhofer diffraction of the
measured phase object is calculated. With a simplified scattering theory,
i.e. Rayleigh-**Gans** scattering, different phase objects are
investigated and their differential cross section is discussed

L2 ANSWER 123 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1987:2831711 INSPEC

DOCUMENT NUMBER: A1987-031580

TITLE: Application of acoustical holography to nonstationary
random processes

AUTHOR: Gan, W.S. (Acoust. Services Pte Ltd., Singapore,
Singapore)

SOURCE: Acoustical Imaging. Proceedings of the 14th
International Symposium, 1985, p. 703-6 of xvi+801
pp., 1 refs.
Editor(s): Berkhout, A.j.; Ridder, J.; Van der Wal,
L.F.

ISBN: 0 306 42094 5

Published by: Plenum, New York, NY, USA

Conference: Acoustical Imaging. Proceedings of the
14th International Symposium, The Hague, Netherlands,
22-25 April 1985

Sponsor(s): Inst. Appl. Geosci. TNO; KLM R. Dutch
Airlines; KEMA; MASSCOMP Eur.; et al

DOCUMENT TYPE: Conference; Conference Article

TREATMENT CODE: Application; Practical

COUNTRY: United States

LANGUAGE: English

AN 1987:2831711 INSPEC DN A1987-031580

AB The concept of 'evolutionary spectra' has been proposed by M. Priestley
to deal with non-stationary processes. Unfortunately, it needs
statistical estimates and approximations. In view of such difficulties,
the authors propose double exposure acoustical holographic interferometry
(AHI) to study non-stationary processes. AHI was proposed by W.S.
Gan in 1970 to study the vibration patterns of the
membranes of microphones. This paper presents the application of
acoustical holography to industrial noise analysis

L2 ANSWER 124 OF 124 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1977:1111559 INSPEC

DOCUMENT NUMBER: A1977-081475

TITLE: Light scattering from red blood cell ghosts:

sensitivity of angular dependent structure to membrane thickness and refractive index
 AUTHOR: Meyer, R.A. (Johns Hopkins Univ., Laurel, MD, USA)
 SOURCE: Applied Optics (Aug. 1977), vol.16, no.8, p. 2036-8, 10 refs.
 CODEN: APOPAI, ISSN: 0003-6935
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Theoretical
 COUNTRY: United States
 LANGUAGE: English

AN 1977:1111559 INSPEC DN A1977-081475

AB Exposing red blood cells to a hypotonic medium can cause them to become hollow spheres with very thin **membranes** (ghosts). The ghost is modelled as two concentric spheres and the light scatter pattern for the model is determined using both Lorentz-Mie theory and Rayleigh-**Gans** theory. The angular dependent structure of the scatter pattern depends on the ghost diameter and is essentially independent of **membrane** thickness and refractive index

=> s l1 (s) (pump or micropump)
 L12 437 L1 (S) (PUMP OR MICROPUMP)

=> s l1 (8w) (pump or micropump)
 L13 156 L1 (8W) (PUMP OR MICROPUMP)

=> display l13 1-156 ibib abs

L13 ANSWER 1 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:428669 CAPLUS
 TITLE: Nanosecond excitonic spin relaxation in cubic GaN
 AUTHOR(S): Tackeuchi, Atsushi; Otake, Hirotaka; Ogawa, Yusuke; Ushiyama, Takafumi; Fujita, Taisuke; Takano, Fumiyoshi; Akinaga, Hiro
 CORPORATE SOURCE: Department of Applied Physics, Waseda University, Tokyo, 169-8555, Japan
 SOURCE: Applied Physics Letters (2006), 88(16), 162114/1-162114/3
 CODEN: APPLAB; ISSN: 0003-6951
 PUBLISHER: American Institute of Physics
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The excitonic spin relaxation process in cubic **GaN** is observed by spin-dependent **pump** and probe reflectance measurements with subpicosecond time resolution. The spin polarization presents at temps. lower than 100 K. The spin relaxation times at 15-75 K are found to be longer than 5 ns and short spin relaxation times on the picosecond order are not present. Although these long spin relaxation times are in striking contrast to the subpicosecond spin relaxation of A-band free excitons in hexagonal GaN, they are consistent with the dependence that spin relaxation time becomes longer for wider-band gap zinc blende semiconductors.

REFERENCE COUNT: 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 2 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:338186 CAPLUS
 DOCUMENT NUMBER: 144:378670
 TITLE: InGaN LED pumped II-VI semiconductor laser
 INVENTOR(S): Govorkov, Sergei V.; Spinelli, Luis A.
 PATENT ASSIGNEE(S): USA
 SOURCE: U.S. Pat. Appl. Publ., 21 pp.

CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2006078031	A1	20060413	US 2004-961262	20041008
WO 2006041619	A2	20060420	WO 2005-US33441	20050916
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				

PRIORITY APPLN. INFO.: US 2004-961262 A 20041008

AB An optically pumped semiconductor laser in accordance with the present invention includes a II-VI semiconductor laser chip and a plurality of InGaN LEDs optically pumping the laser chip, where an optical arrangement collects the pump light from the LEDs and directs the pump light to light-concentrating optical device that is either directly or indirectly in optical contact with the laser chip and is arranged to concentrate the pump light on the chip with maximized numerical aperture. In one example of the laser, the light-concentrating device is an immersion lens. In another example of the laser, the light-concentrating device is a tapered light-pipe.

L13 ANSWER 3 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:136909 CAPLUS

DOCUMENT NUMBER: 144:359305

TITLE: Long-lived, coherent acoustic phonon oscillations in GaN single crystals

AUTHOR(S): Wu, S.; Geiser, P.; Jun, J.; Karpinski, J.; Park, J.-R.; Sobolewski, Roman

CORPORATE SOURCE: Department of Physics and Astronomy and the Laboratory for Laser Energetics, University of Rochester, Rochester, NY, 14623, USA

SOURCE: Applied Physics Letters (2006), 88(4), 041917/1-041917/3

CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Coherent acoustic phonon (CAP) oscillations were studied in high-quality bulk GaN single crystals with a 2-color fs optical pump-probe technique. Using a far-above-the-band gap UV excitation (.apprx.270 nm wavelength) and a near-IR probe beam ($\lambda \approx 810$ nm), the long-lived, CAP transients were observed within a 10 ns time-delay window between the pump and probe pulses, with a dispersionless (proportional to the probe-beam wave vector) frequency of .apprx.45 GHz. The measured CAP attenuation corresponded directly to the absorption of the probe light in bulk GaN, indicating that the actual (intrinsic) phonon-wave attenuation in the crystals was significantly smaller than the measured 65.8 cm⁻¹ value. The velocity of the phonon propagation was equal to the velocity of sound in GaN.

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS

L13 ANSWER 4 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1304100 CAPLUS

DOCUMENT NUMBER: 144:179462

TITLE: Femtosecond pump-probe spectroscopy of propagating coherent acoustic phonons in In_xGa_{1-x}N/GaN heterostructures

AUTHOR(S): Liu, Rongliang; Sanders, G. D.; Stanton, C. J.; Kim, Chang Sub; Yahng, J. S.; Jho, Y. D.; Yee, K. J.; Oh, E.; Kim, D. S.

CORPORATE SOURCE: Department of Physics, University of Florida, Gainesville, FL, 32611-8440, USA

SOURCE: Physical Review B: Condensed Matter and Materials Physics (2005), 72(19), 195335/1-195335/11
CODEN: PRBMDO; ISSN: 1098-0121

PUBLISHER: American Physical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Large amplitude coherent acoustic phonon wave packets can be generated and detected in In_xGa_{1-x}N/GaN epilayers and heterostructures in femtosecond pump-probe differential reflectivity expts. The amplitude of the coherent phonon increases with increasing In fraction *x* and unlike other coherent phonon oscillations, both amplitude and period are strong functions of the laser probe energy. The amplitude of the oscillation is substantially and almost instantaneously reduced when the wave packet reaches a GaN-sapphire interface below the surface indicating that the phonon wave packets are useful for imaging below the surface. A theor. model is proposed which fits the expts. well and helps to deduce the strength of the phonon wave packets. The authors' model shows that localized coherent phonon wave packets are generated by the femtosecond pump laser in the epilayer near the surface. The wave packets then propagate through a GaN layer changing the local index of refraction and, as a result, modulate the reflectivity of the probe beam. The authors' model correctly predicts the exptl. dependence on probe wavelength as well as epilayer thickness.

REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 5 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1265095 CAPLUS

DOCUMENT NUMBER: 143:485552

TITLE: Short wavelength diode-pumped solid-state laser

INVENTOR(S): Takeuchi, Eric B.; Hargis, David E.

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 21 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005265411	A1	20051201	US 2005-138606	20050525
WO 2005117216	A2	20051208	WO 2005-US19065	20050525
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU,			

ZA, ZM, ZW
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT,
RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,
MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.:

US 2004-574351P P 20040525

AB A diode-pumped solid-state laser including a short wavelength (e.g., blue, violet, or UV) semiconductor laser that pumps an absorption transition in a rare-earth-doped material. Responsive to this pumping, the rare-earth active ion directly emits laser radiation. A number of different wavelength outputs, including short wavelengths, are achievable dependent upon the material and the pump wavelength. The gain medium may include an active ion selected from Er³⁺, Sm³⁺, Eu³⁺, Tb³⁺, Dy³⁺, Tm³⁺, Ho³⁺, and Pr³⁺. A laser diode pump source has a wavelength in the range of .apprx.365 nm to 480 nm to excite a laser emission at 370-800 nm. The laser diode pump source may comprise a GaN-based semiconductor. In some embodiments, the laser diode pump source supplies a pump beam at 370-380 nm, 400-415 nm, 435-445 nm, or 468-478 nm.

L13 ANSWER 6 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1182734 CAPLUS

DOCUMENT NUMBER: 144:139620

TITLE: Hot carrier dynamics and carrier-phonon interaction in GaN

AUTHOR(S): Kyhm, K.; Taylor, R. A.; Cain, N. J.

CORPORATE SOURCE: Research Center for Dielectric and Advanced Matter Physics, School of Physics, Pusan National University, Pusan, 609-725, S. Korea

SOURCE: Journal of the Korean Physical Society (2005), 47(Suppl. 2), S356-S359

CODEN: JKPSDV; ISSN: 0374-4884

PUBLISHER: Korean Physical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The dynamics of carriers in GaN epilayers is investigated by using femtosecond pump-probe spectroscopy. After the residual chirp on the continuum probe is removed, the normalized difference spectra (NDS) for different probe energies are synchronized, recovering the full time resolution of our laser pulse. Our Monte-Carlo simulation agrees well with the unchirped NDS spectrum, which shows the development of the carrier distribution at early times, where phonon satellites are seen, together with a strong non-thermal electron distribution in the region of the LO-phonon energy arising from the remarkably strong electron-LO phonon interaction. By employing a new technique which involves the integration of the normalized NDS multiplied by the corresponding energy, a measure of the mean energy of the carriers in non-thermal states is obtained. By comparing the time-dependent energy loss with the theor. energy loss rate, we estimate the effective temperature of the phonon modes as well as the population of phonons.

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 7 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1130136 CAPLUS

DOCUMENT NUMBER: 143:413276

TITLE: LED light source

INVENTOR(S): Takahashi, Kiyoshi; Yano, Tadashi; Shimizu, Masanori; Tanimoto, Noriyasu

PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005294779	A2	20051020	JP 2004-111791	20040406
PRIORITY APPLN. INFO.:			JP 2004-111791	20040406

AB The invention relates to a light-emitting device (LED) light source comprising a substrate with wiring pattern, electrodes, GaN-type LED, bridge chip mounted by a pump, where the LED chip is surrounded by materials having more than 10 dielec. constant, and covered by more than 5 wt% resin being contacted by the two electrodes.

L13 ANSWER 8 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1046417 CAPLUS
 DOCUMENT NUMBER: 144:138376
 TITLE: Make light, not heat: toward higher efficiency nitride semiconductor ultraviolet optical sources
 AUTHOR(S): Wraback, Michael; Garrett, Gregory A.; Sampath, Anand V.; Collins, Charles J.; Shen, Paul H.
 CORPORATE SOURCE: Sensors and Electron Devices Dir., U.S. Army Research Lab., Adelphi, MD, 20783, USA
 SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2004), 5617, 209-220
 CODEN: PSISDG; ISSN: 0277-786X
 PUBLISHER: SPIE-The International Society for Optical Engineering
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB We have used subpicosecond time-resolved photoluminescence (TRPL) downconversion techniques to study the interplay of carrier localization and radiative and nonradiative processes in the active regions of light emitting III-nitride semiconductor UV optical sources, with the goal of identifying potential approaches that will lead to higher radiative efficiency. Comparison of TRPL in (In)AlGa_N multiple quantum well active regions indicate that for addition of only 0.01 In content the PL decay time in an InAlGa_N MQW is more than double that in an AlGa_N MQW designed to emit at the same wavelength (360 nm), thus indicating the importance of indium for improvement of material quality, most likely through the suppression of point defects. This result is further underscored by TRPL data on 320 nm InAlGa_N MQW active regions, which exhibit longer PL lifetimes than expected for growth on GaN templates with dislocation densities in the mid-10⁸cm⁻² range. While the PL lifetimes in these InAlGa_N MQWs improve for growth on lower dislocation d. HVPE bulk GaN substrates, a similar phenomenon is not observed for deposition on nearly dislocation-free bulk AlN substrates, suggesting that defect generation in the MQWs associated with lattice mismatch or AlN surface preparation may play

an

important role. The pump intensity dependence of the time zero signal and the TRPL decays in the MQWs implies that internal elec. field-induced recombination through the barriers and interface states plays an important role in the radiative efficiency of quantum well active regions for c-axis oriented materials and devices. The effect of these internal elec. fields can be mitigated through the use of nonpolar MQWs. The combination of more intense time-integrated PL spectra and shorter PL lifetimes with decreasing well width in GaN/AlGa_N MQWs grown on a-plane LEO GaN for low pump intensity suggests that the radiative lifetime becomes shorter due to the accompanying increase in exciton binding energy and oscillator strength at smaller well width in these high quality samples. Finally, it is demonstrated that compositional fluctuations in

AlGa_N active regions grown by plasma-assisted MBE can be employed to create spatial localization that enhances the luminescence efficiency and PL lifetime (300-400 ps) despite high defect d. ($>10^{10}\text{cm}^{-2}$) by inhibiting movement of carriers to nonradiative sites. Significant enhancement of this phenomenon has been obtained in a DH LED structure grown on a lower defect d. (mid- 10^9cm^{-2}) AlGa_N template, with PL lifetime increased by nearly a factor of two, corresponding to a defect d. in the mid- 10^7cm^{-2} range, and only a 3.3 times drop in PL intensity when the temperature is raised from 12 K to room temperature, suggesting up to .apprx.30% internal quantum efficiency.

REFERENCE COUNT: 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 9 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:463309 CAPLUS

DOCUMENT NUMBER: 143:141510

TITLE: Dynamic polarization filtering in anisotropically strained M-plane Ga_N films

AUTHOR(S): Omae, K.; Flissikowski, T.; Misra, P.; Brandt, O.; Grahn, H. T.; Kojima, K.; Kawakami, Y.

CORPORATE SOURCE: Paul-Drude-Institut fur Festkorperelektronik, Berlin, 10117, Germany

SOURCE: Applied Physics Letters (2005), 86(19), 191909/1-191909/3

CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The dynamic optical polarization filtering for anisotropically strained M-plane Ga_N films on LiAlO₂ was studied by pump and probe spectroscopy. Due to a very large polarization anisotropy in the absorption coefficient, these films exhibit an intrinsic polarization filtering, which appears as a rotation of the polarization vector after transmission of linearly polarized light through the film. For dynamic filtering, the polarization rotation is controlled by the pump, since the photoexcited carriers remove the intrinsic linear dichroism by selective bleaching of the anisotropic absorption. The dynamic behavior of the polarization rotation is mainly determined by the redistribution of holes between the two uppermost valence bands and by the recombination time. The latter is comparable to the measured decay time of the dynamic rotation of .apprx.15 ps. For M-plane Ga_N films, the maximum dynamic rotation reaches 35°, while the maximum static polarization rotation is .apprx.40°.

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 10 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:454590 CAPLUS

DOCUMENT NUMBER: 143:294306

TITLE: Ultrafast intersubband relaxation in Ga_N/Al_N MQWs

AUTHOR(S): Hamazaki, Junichi; Ikuno, Keita; Takahashi, Hikaru; Kunugita, Hideyuki; Ema, Kazuhiro; Kikuchi, Akihiko; Kishino, Katsumi

CORPORATE SOURCE: Dep. Phys., Sophia Univ., Tokyo, Japan

SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2005), 5725(Ultrafast Phenomena in Semiconductors IX), 265-274

CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We have investigated the ultrafast relaxation dynamics of intersubband

transition (ISBT) in **GaN/AlN**, using a two-color **pump**-probe technique, in a wide energy range around the optical communication wavelength. We suggest that the origin of the signal depends on the relation between the pump and probe pulse energies. We have observed an ultrafast induced absorption signal and a slow neg. component which are due to the absorption of electrons during intra-subband scattering and a carrier cooling process with a hot-phonon effect, resp. Moreover, we clarify the origin of the inhomogeneous broadening width of the ISBT and of the intrinsic absorption width of ISBT from the detailed analyses of the result. We have reproduced the relaxation dynamics by a numerical calcn. to confirm this interpretation of ISBT relaxation dynamics.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 11 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:384174 CAPLUS

DOCUMENT NUMBER: 143:85841

TITLE: Intersubband relaxation dynamics in **GaN/AlN** multiple quantum wells studied by two-color **pump**-probe experiments

AUTHOR(S): Hamazaki, J.; Kunugita, H.; Ema, K.; Kikuchi, A.; Kishino, K.

CORPORATE SOURCE: Department of Physics, Sophia University, Tokyo, 102-8554, Japan

SOURCE: Physical Review B: Condensed Matter and Materials Physics (2005), 71(16), 165334/1-165334/5
CODEN: PRBMDO; ISSN: 1098-0121

PUBLISHER: American Physical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We have investigated intersubband relaxation in **GaN/AlN** multiple quantum wells using a two-color **pump**-probe technique in a wide energy range around 800 meV (1.55 μm). We have observed not only absorption bleaching signals but also, for the first time, induced absorption signals with an ultrafast and a slow component. Absorption bleaching signals are attributed to a phase space filling of the upper subband and a carrier cooling process in the lower subband, with relaxation times of 140 and 300-400 fs, resp. The ultrafast induced absorption corresponds to the absorption of electrons during intra-subband relaxation and the slow component of 1.3 ps corresponds to the carrier cooling process. We have also found that the intrinsic absorption width of highly doped materials is as large as the inhomogeneous width, because the dispersion difference of subbands is enhanced by exchange interaction.

REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 12 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:243515 CAPLUS

DOCUMENT NUMBER: 143:69306

TITLE: Ultrafast inter-subband relaxation and carrier cooling in **GaN/AlN** multiple quantum wells

AUTHOR(S): Hamazaki, Junichi; Kunugita, Hideyuki; Ema, Kazuhiro; Matsui, Satoshi; Ishii, Yohei; Morita, Takayuki; Kikuchi, Akihiko; Kishino, Katsumi

CORPORATE SOURCE: Department of Physics, Sophia University, Tokyo, Japan

SOURCE: Springer Series in Chemical Physics (2005), 79(Ultrafast Phenomena XIV), 295-297
CODEN: SSCPDA; ISSN: 0172-6218

PUBLISHER: Springer GmbH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors studied inter-subband relaxation dynamics in **GaN/AlN**

multiple quantum wells by the 2-color **pump**-probe technique. The authors explain the ultrafast relaxation scenario that includes thermalization and cooling steps, and observed that relaxation is influenced by a hot-phonon effect.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 13 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:142945 CAPLUS

DOCUMENT NUMBER: 142:401128

TITLE: Electron-hole plasma Mott transition and stimulated emission in GaN

AUTHOR(S): Kyhm, K.; Taylor, R. A.; Ryan, J. F.; Beaumont, B.; Gibart, P.

CORPORATE SOURCE: Research Center for Dielectric and Advanced Matter Physics, School of Physics, Pusan National University, Pusan, 609-735, S. Korea

SOURCE: Journal of the Korean Physical Society (2004), 45(Suppl. Issue), S526-S529
CODEN: JKPSDV; ISSN: 0374-4884

PUBLISHER: Korean Physical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We present femtosecond **pump**-probe reflectance measurements of excitons in **GaN** for various **pump** intensities. Saturation of the excitonic absorption with increasing carrier d. was measured in the case of resonant and non-resonant excitations during the rising times, and the exciton bleaching densities for various excitation energies were also measured. We found that the resonant excitons are bleached at higher densities (.apprx.10 times) than the non-resonant excitons due to the absence of free carriers. The stimulated emission mechanism is investigated by measuring simultaneously the photoluminescence and the time-resolved reflectance near the band edge, over a range of excitation densities. The onset of the stimulated emission coincides with the bleaching d. of the non-resonant excitons as well as a theor. gain threshold d. These results suggest that the stimulated emission in GaN is due to the electron-hole plasma.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 14 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:907898 CAPLUS

DOCUMENT NUMBER: 142:13037

TITLE: Subpicosecond exciton spin relaxation in GaN

AUTHOR(S): Kuroda, T.; Yabushita, T.; Kosuge, T.; Tackeuchi, A.; Taniguchi, K.; Chinone, T.; Horio, N.

CORPORATE SOURCE: Department of Applied Physics, Waseda University, Tokyo, 169-8555, Japan

SOURCE: Applied Physics Letters (2004), 85(15), 3116-3118
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The spin-relaxation process of A-band exciton in **GaN** is observed by spin-dependent **pump** and probe reflectance measurement with subpicosecond time resolution. The spin-relaxation times at 150-225 K are 0.47-0.25 ps. These are at least one order of magnitude shorter than those of the other III-V compound semiconductors. The spin-relaxation time τ_s is found to be proportional to $T^{-1/4}$, where T is the temperature

REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 15 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:463059 CAPLUS

DOCUMENT NUMBER: 141:164000

TITLE: Dynamics of the pump-probe reflectivity spectra in GaAs and GaN

AUTHOR(S): Prabhu, S. S.; Vengurlekar, A. S.

CORPORATE SOURCE: Tata Institute of Fundamental Research, Mumbai, 400005, India

SOURCE: Journal of Applied Physics (2004), 95(12), 7803-7812
CODEN: JAPIAU; ISSN: 0021-8979

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The pump-probe reflectivity (PPR) technique is a quick way to characterize the short carrier lifetime in materials which may be potentially good THz emitters or detectors. The PPR signal in semiconductors was studied theor. in the frequency domain (at various energies above and below the band gap) as a function of pump-probe delay. Two conditions of carrier relaxation are considered. In 1, the carriers are assumed to form a hot, thermalized energy distribution during excitation itself and then to cool via phonon emission, as is expected in the case of high d. excitation in GaAs. In the other case, the carriers essentially remain in a nonequil., nonthermal state even as they relax. This can happen when the carrier-longitudinal optical phonon interaction is stronger than carrier-carrier scattering, as is likely in GaN even at moderately high densities. Effects of carrier trapping and recombination determining the carrier lifetime are included. The calcn. takes into account the effect of Sommerfeld factor and pump induced modulation of the probe reflectivity due to band filling (BF), band gap renormalization (BGR), and free carrier absorption. Signatures of carrier cooling and decay can be identified from the delay dependence of the PPR signal at high enough carrier densities ($\geq 1 \times 10^{18} \text{ cm}^{-3}$) when the carrier cooling rate is comparable with the decay rate. In that case, carrier cooling shows up in the reflectivity signal as a rise in the time evolution whereas the signal decay is mainly related to carrier decay, albeit in a nonexponential way. However, at lower densities, the signal evolution with delay is rather complex. There, it is not possible to identify the signature of carrier cooling and the decay of the signal is not governed simply by the carrier decay rate. In general, the magnitude and signature of the PPR signal at different delays are governed by an interplay between the BGR and BF effects. The delay dependence of the signal is a very sensitive function of BGR used to describe its d. dependence at low densities. The delay and frequency dependence of the PPR signal is different for a thermalized, cooling distribution from that for the relaxing, nonthermalized distribution. Thus, PPR expts. may be able to distinguish rapid carrier relaxation via a cascade emission of longitudinal optical phonons due to stronger Frohlich coupling in GaN from cooling of hot, thermalized carriers in GaAs.

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 16 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:440768 CAPLUS

DOCUMENT NUMBER: 142:382607

TITLE: Generation of coherent acoustic phonons in nitride-based semiconductor nanostructures

AUTHOR(S): Chern, Gia-Wei; Sun, Chi-Kuang; Sanders, Gary D.; Stanton, Christopher J.

CORPORATE SOURCE: Graduate Institute of Electro-Optical Engineering, National Taiwan University, Taipei, Taiwan, 10617, Peop. Rep. China

SOURCE: Topics in Applied Physics (2004), 92(Ultrafast

Dynamical Processes in Semiconductors), 339-394

CODEN: TAPHD4; ISSN: 0303-4216

PUBLISHER: Springer-Verlag
DOCUMENT TYPE: Journal; General Review
LANGUAGE: English

AB We review exptl. and theor. aspects of coherent acoustic phonon generation in nitride-based semiconductor nanostructures, with particular application to InGaN/GaN multiquantum wells (MQWs). We 1st discuss the exptl. generation and detection of coherent longitudinal-acoustic (LA) phonon oscillations in InGaN/GaN MQWs using the transmission-type **pump**-probe technique. With UV femtosecond pulse excitation, photogenerated carriers screen the piezoelec. field and initiate the dispersive coherent phonon oscillations. The spatial wavevector of the periodic carrier distribution det. the phonon-oscillation frequency. The induced acoustic phonon oscillations result in a piezoelec. field modulation that then causes an absorption variation through the Franz-Keldysh effect. Injecting another control pulse can further control the resulting coherent phonon oscillations. Both magnitude and phase manipulation can be achieved by controlling the intensity and time delay of the control pulse. After reviewing the exptl. results, we then present a microscopic theory of the generation and propagation of coherent LA phonons in wurtzite semiconductor MQWs. Under typical exptl. conditions, the propagation of coherent LA phonons is described by a loaded-string equation for the lattice displacement, where the time- and position-dependent loading term is a function of the photoexcited carrier d. We note that this differs from the situation in which coherent LO-phonon oscillations are generated in bulk systems where the coherent LO phonons obey a forced-oscillator equation as opposed to a loaded-string equation. Both deformation-potential and piezoelec.-coupling mechanisms contribute to the driving force in the loaded-string equation. We also discuss a macroscopic theory for the generation and dynamics of coherent acoustic phonons in wurtzite semiconductor nanostructures. This approach is based on macroscopic continuum constitution equations for piezoelec. wurtzite semiconductors. Starting from Poisson's equation and the dynamic elastic equation, a vector-loaded wave equation is obtained. By projecting the corresponding equation to eigenvectors of the elastic Christoffel equation, the loaded-string equation can also be obtained. The macroscopic approach is then used to study the orientation effects on the generation of coherent acoustic phonons and it is found that large coherent transverse acoustic phonon oscillation can be generated when the growth direction of the nanostructure is along certain directions, e.g., [1010]. This coherent transverse wave may have special applications in THz ultrasonics. Finally, a phenomenol. theory for the transient transmission measurement of coherent acoustic phonons is presented. Calcns. based on the loaded-string equation with the optical-measurement theory agree well with the expts.

REFERENCE COUNT: 90 THERE ARE 90 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 17 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:393298 CAPLUS

DOCUMENT NUMBER: 142:326710

TITLE: Femtosecond intersubband dynamics of electrons in AlGaIn/GaN high-electron-mobility transistors

AUTHOR(S): Wang, Z.; Reimann, K.; Woerner, M.; Elsaesser, T.; Hofstetter, D.; Hwang, J.; Schaff, W. J.; Eastman, L. F.

CORPORATE SOURCE: Max-Born-Institut fuer Nichtlineare Optik und Kurzzeitspektroskopie, Berlin, 12489, Germany

SOURCE: Trends in Optics and Photonics (2003), 89(Quantum Electronics and Laser Science (QELS)), QThM2/1-QThM2/2
CODEN: TOPRBS

PUBLISHER: Optical Society of America

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Ultrafast electron dynamics in the inversion layer of an AlGa_N/Ga_N transistor is studied in **pump**-probe expts. with 50-fs mid-IR pulses. El-e2 intersubband scattering and thermalization occur within 200 fs.

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 18 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:337422 CAPLUS

DOCUMENT NUMBER: 141:233916

TITLE: Femtosecond intersubband dynamics of electrons in AlGa_N/Ga_N-based high-electron-mobility transistors

AUTHOR(S): Wang, Z.; Reimann, K.; Woerner, M.; Elsaesser, T.; Hofstetter, D.; Hwang, J.; Schaff, W. J.; Eastman, L. F.

CORPORATE SOURCE: Max-Born-Institut fuer Nichtlineare Optik und Kurzzeitspektroskopie, Berlin, 12489, Germany

SOURCE: Semiconductor Science and Technology (2004), 19(4), S463-S464

CODEN: SSTEET; ISSN: 0268-1242

PUBLISHER: Institute of Physics Publishing

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Ultrafast electron dynamics in the inversion layer of an AlGa_N/Ga_N transistor is studied in **pump**-probe expts. with 50 fs mid-IR pulses. Two-color pump-probe measurements show an instantaneous transmission increase for all spectral positions of the probe, which demonstrates that homogeneous broadening is an important contribution to the total linewidth in this material. We observe the maximum of the induced transmission change around 5 μ m. This large Stokes shift might be caused by the extremely large electron-LO-phonon scattering rate.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 19 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:318208 CAPLUS

DOCUMENT NUMBER: 141:44306

TITLE: Femtosecond studies of electron capture times in InGa_N/Ga_N multiple quantum wells

AUTHOR(S): Fan, W. H.; Olaizola, S. M.; Wells, J.-P. R.; Fox, A. M.; Wang, T.; Parbrook, P. J.; Mowbray, D. J.; Skolnick, M. S.

CORPORATE SOURCE: Department of Physics and Astronomy, University of Sheffield, Sheffield, S3 7RH, UK

SOURCE: Applied Physics Letters (2004), 84(16), 3052-3054

CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Subpicosecond time-resolved differential transmission spectroscopy was used to study the carrier d. and temperature dependence of the quantum well electron capture time of blue-emitting InGa_N/Ga_N multiple quantum well structures. The capture time varies significantly with both temperature and carrier d., the latter effect being consistent with carrier-induced band bending or increased carrier-carrier scattering. At room temperature, the electron capture time is in the range 0.4-0.8 ps for carrier densities $\leq 5 \times 10^{18} \text{ cm}^{-3}$.

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 20 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:859779 CAPLUS

DOCUMENT NUMBER: 140:101263

TITLE: Nondegenerate pump and probe spectroscopy in InGaN thin films

AUTHOR(S): Nomura, Masahiro; Arita, Munetaka; Arakawa, Yasuhiko; Ashihara, Satoshi; Kako, Satoshi; Nishioka, Masao; Shimura, Tsutomu; Kuroda, Kazuo

CORPORATE SOURCE: Institute of Industrial Science, University of Tokyo, Meguro-ku, Tokyo, 153-8505, Japan

SOURCE: Journal of Applied Physics (2003), 94(10), 6468-6471
CODEN: JAPIAU; ISSN: 0021-8979

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Carrier dynamics in In_{0.10}Ga_{0.90}N/In_{0.03}Ga_{0.97}N multiple quantum wells and epilayers were studied by nondegenerate femtosecond pump and probe spectroscopy and by using monochromatic continuous wave light at room temperature. Structurally dependent transient absorption spectra were observed after pump pulse excitation. These spectral changes are caused by excitonic absorption quenching and screening of internal piezoelec. fields by photoinduced carriers. Both rapid (.apprx.400 ps) and slow (.apprx.90 μs) temporal behavior was observed in the transient absorption spectra. The results of time-resolved photoluminescence measurements and the existence of saturation pump fluences indicate that trapped carriers in potential min. originating from In-rich regions and/or midgap carrier traps are responsible for the lasting screening of the internal elec. field.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 21 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:847592 CAPLUS

DOCUMENT NUMBER: 140:172717

TITLE: Ultrafast spectroscopy of propagating coherent acoustic phonons in GaN/InGaN heterostructures

AUTHOR(S): Liu, Rongliang; Kim, Chang Sub; Sanders, G. D.; Stanton, C. J.; Yahng, J. S.; Jho, Y. D.; Yee, K. J.; Oh, E.; Kim, D. S.

CORPORATE SOURCE: Department of Physics, University of Florida, Gainesville, FL, 32611-8440, USA

SOURCE: Los Alamos National Laboratory, Preprint Archive, Condensed Matter (2003) 1-12, arXiv:cond-mat/0310654, 28 Oct 2003

CODEN: LNCMFR

URL: <http://xxx.lanl.gov/pdf/cond-mat/0310654>

PUBLISHER: Los Alamos National Laboratory

DOCUMENT TYPE: Preprint

LANGUAGE: English

AB We show that large amplitude, coherent acoustic phonon wavepackets can be generated and detected in In_xGa_{1-x}GaN epilayers and heterostructures in femtosecond pump-probe differential reflectivity expts. The amplitude of the coherent phonon increases with increasing Indium fraction x and unlike other coherent phonon oscillations, both amplitude and period are strong functions of the laser probe energy. The amplitude of the oscillation is substantially and almost instantaneously reduced when the wavepacket reaches a GaN-sapphire interface below the surface indicating that the phonon wavepackets are useful for imaging below the surface. A theor. model is proposed which fits the expts. well and helps to deduce the strength of the phonon wavepackets. Our model shows that localized coherent phonon wavepackets

are generated by the femtosecond pump laser in the epilayer near the surface. The wavepackets then propagate through a GaN layer changing the local index of refraction, primarily through the Franz-Keldysh effect, and as a result, modulate the reflectivity of the probe beam. Our model correctly predicts the exptl. dependence on probe-wavelength as well as epilayer thickness.

REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 22 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:474559 CAPLUS

DOCUMENT NUMBER: 139:237297

TITLE: Femtosecond pump and probe spectroscopy of optical nonlinearities in an InGaN/GaN heterostructure

AUTHOR(S): Chen, Fei; Cartwright, A. N.

CORPORATE SOURCE: Department of Electrical Engineering, State University of New York at Buffalo, Buffalo, NY, 14260, USA

SOURCE: Materials Research Society Symposium Proceedings (2003), 743(GaN and Related Alloys--2002), 665-669
CODEN: MRSPDH; ISSN: 0272-9172

PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The magnitudes and evolutions of two photoinduced absorption nonlinearities, absorption bleaching and field screening, were compared and studied by employing electroabsorption and femtosecond pump-probe spectroscopy in a biased InGaN/GaN p-i-n double heterostructure. Steady state electroabsorption measurements indicate the field induced absorption coefficient changes in this structure are caused by the Franz-Keldysh effect. The temporal resolution of the absorption bleaching spectra suggests that the photoinduced carriers rapidly relaxed to the InGaN band edge within several picoseconds. As the applied reverse bias field was increased, the transition of the differential absorption spectral signature from the signature for absorption bleaching to the signature for field screening was observed. The magnitude of the change in absorption due to photoinduced carrier screening of the applied field is quantified and compared to absorption bleaching.

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 23 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:248894 CAPLUS

DOCUMENT NUMBER: 139:43865

TITLE: Ultrafast differential transmission spectroscopy of excitonic transitions in InGaN/GaN multiple quantum wells

AUTHOR(S): Chen, Fei; Cheung, M. C.; Sweeney, Paul M.; Kirkey, W. D.; Furis, M.; Cartwright, A. N.

CORPORATE SOURCE: Department of Electrical Engineering, State University of New York at Buffalo, Buffalo, NY, 14260, USA

SOURCE: Journal of Applied Physics (2003), 93(8), 4933-4935
CODEN: JAPIAU; ISSN: 0021-8979

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Room-temperature carrier dynamics in InGaN/GaN multiple quantum wells are studied by employing ultrafast pump-probe spectroscopy. Specifically, the observed differential spectral signatures are characteristic of changes in the absorption coefficient through both a reduction of the quantum-confined Stark shift due to the photoinduced in-well field screening (low carrier densities) and excitonic absorption quenching (high

carrier densities). The comparison of the differential absorption spectra at different injected carrier densities allows one to sep. field screening from excitonic bleaching. The estimated in-well field at the transition point between field screening and excitonic bleaching is consistent with the theor. value of the piezoelec. field in the strained InGaN well.

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 24 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:880696 CAPLUS

DOCUMENT NUMBER: 138:161547

TITLE: Ultrashort hole capture time in Mg-doped GaN thin films

AUTHOR(S): Lin, Kung-Hsuan; Chern, Gia-Wei; Chu, Shi-Wei; Sun, Chi-Kuang; Xing, Huili; Smorchkova, Yulia; Keller, Stacia; Mishra, Umesh; DenBaars, Steven P.

CORPORATE SOURCE: Department of Electrical Engineering and Graduate Institute of Electro-Optical Engineering, National Taiwan University, Taipei, 10617, Taiwan

SOURCE: Applied Physics Letters (2002), 81(21), 3975-3977
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Hole capture time in p-type GaN was measured by using a femtosecond pump-probe technique. The capture time constant that holes are trapped by Mg-related states is shorter than 10 ps. The hole capture time increases with decreased hole excess energy. By comparing two samples with different doping concns., the hole capture time also decreases with increased doping concns.

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 25 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:820622 CAPLUS

DOCUMENT NUMBER: 138:128699

TITLE: Self-heating effects at high pump currents in deep ultraviolet light-emitting diodes at 324 nm

AUTHOR(S): Chitnis, A.; Sun, J.; Mandavilli, V.; Pachipulusu, R.; Wu, S.; Gaevski, M.; Adivarahan, V.; Zhang, J. P.; Khan, M. Asif; Sarua, A.; Kuball, M.

CORPORATE SOURCE: Department of Electrical Engineering, University of South Carolina, Columbia, SC, 29208, USA

SOURCE: Applied Physics Letters (2002), 81(18), 3491-3493
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors present a detailed high-pump-current study of self-heating effects in UV light-emitting diodes (LEDs) grown on sapphire. For deep UV LEDs on sapphire, results establish self-heating to be a primary cause of premature power saturation under d.c. pumping. Even the flip-chip packaged devices undergo a steady-state temperature rise to .apprx.70° at a d.c. pump current of only 50 mA (at 8 V) resulting in a significant decrease in LED output. Temperature rise values estimated from peak emission wavelength shifts

and from micro-Raman mapping of the active devices were in good agreement.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 26 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:719483 CAPLUS

DOCUMENT NUMBER: 138:63515
TITLE: Optical pump-and-probe measurement of the thermal conductivity of nitride thin films
AUTHOR(S): Daly, B. C.; Maris, H. J.; Nurmikko, A. V.; Kuball, M.; Han, J.
CORPORATE SOURCE: Department of Physics, Brown University, Providence, RI, 02912, USA
SOURCE: Journal of Applied Physics (2002), 92(7), 3820-3824
CODEN: JAPIAU; ISSN: 0021-8979
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The authors report on measurements of the thermal conductivity of epitaxially grown nitride thin films. These semiconductor materials are of considerable technol. importance for applications such as blue-light emitters and high-power, high frequency electronic devices. Measurements were made at 150-400 K using an optical technique in which the sample is heated with an ultrashort (.apprx.150 fs) light pulse, and a time-delayed probe light pulse is used to measure the temperature of the sample as a function of time. The conductivity of the polycryst. sample and the alloys are significantly reduced compared to published values for bulk GaN.
REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 27 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:671372 CAPLUS
DOCUMENT NUMBER: 137:390496
TITLE: Excitonic optical Stark effect in GaN
AUTHOR(S): Choi, Chan-Kyung; Chang, Yia-Chung; Lam, Jack Biu; Shee, Sang-Kee; Krasinski, Jerzy S.; Song, Jin-Joo
CORPORATE SOURCE: Center Laser and Photonics Res., Oklahoma State Univ., Stillwater, OK, 74078-0444, USA
SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2002), 4643(Ultrafast Phenomena in Semiconductors VI), 139-147
CODEN: PSISDG; ISSN: 0277-786X
PUBLISHER: SPIE-The International Society for Optical Engineering
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The authors report exptl. and theor. studies of the excitonic optical Stark effect in GaN photoexcited below the excitonic resonances with various polarization configurations and pump detunings, using nondegenerate pump-probe spectroscopy at 10 K. The Stark effect in GaN is strongly dependent on pump and probe relative linear polarizations. This dependence results from the small spin-orbit splitting in GaN and a mixing of A and B valence bands induced by a linearly polarized pump. Using two different circular polarization configurations, the authors also observed splitting of degenerate excitons because of different optical Stark shifts. The authors' exptl. results are explained by a simple theor. model.
REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 28 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:507138 CAPLUS
DOCUMENT NUMBER: 137:207845
TITLE: Midinfrared pump-probe reflection spectroscopy of the coupled phonon-plasmon mode in GaN
AUTHOR(S): Nagai, Masaya; Ohkawa, Kazuhiro; Kuwata-Gonokami, Makoto
CORPORATE SOURCE: Department of Applied Physics, The University of

Tokyo, Japan Science and Technology Corporation (JST),
Cooperative Excitation Project ERATO, Tokyo, 113-8656,
Japan

SOURCE: Applied Physics Letters (2002), 81(3), 484-486
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Strong photoinduced reflectivity change in the mid-IR region in GaN is observed by femtosecond pump-probe measurements. By comparing the results of simultaneous emission and reflectivity measurements, we show that mid-IR reflectivity spectra are governed by coupled phonon-plasmon modes and spatial inhomogeneity of carrier d. Even when the plasma frequency lies in the far-IR region at low carrier d. of 1018 cm⁻³, the strong plasmon-phonon coupling drives the position of upper phonon-plasmon mode to mid-IR region, allowing us to investigate dynamics of photogenerated free carriers in GaN-based materials by mid-IR reflectivity measurements.

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 29 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:450181 CAPLUS
DOCUMENT NUMBER: 137:15022
TITLE: Integrated micropump analysis chip and method of making the same
INVENTOR(S): Beach, Robert A.; Strittmatter, Robert P.; McGill, Thomas C.
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 7 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002071785	A1	20020613	US 2001-923582	20010807
PRIORITY APPLN. INFO.:			US 2000-223672P	P 20000808

AB An integrated micropump or a plurality of integrated micropumps are communicated to a plurality of anal. chambers. A plurality of integrated anal. chambers include integrated anal. devices to test a fluid for an analyte. The micropumps continuously or periodically pump the fluid into the anal. chambers and flush the anal. chambers after anal. of the analyte. In one embodiment, the anal. device comprises an integrated LED and an integrated optical detector. The LED and detector are tuned to an optical absorption line of the analyte. The micropumps are composed of nitrides of B, Al, Ga, In, Tl or combinations thereof and fabricated using photoelectrochem. techniques. The anal. chambers, and micropumps including the anal. devices are simultaneously fabricated during which fabrication of the micropumps and the anal. devices are masked from the photoelectrochem. techniques.

L13 ANSWER 30 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:309467 CAPLUS
DOCUMENT NUMBER: 136:392592
TITLE: Polarization dependence of the excitonic optical Stark effect in GaN
AUTHOR(S): Choi, C. K.; Lam, J. B.; Gainer, G. H.; Shee, S. K.; Krasinski, J. S.; Song, J. J.; Chang, Yia-Chung
CORPORATE SOURCE: Center for Laser and Photonics Research and Department

of Physics, Oklahoma State University, Stillwater, OK,
74078-0444, USA
SOURCE: Physical Review B: Condensed Matter and Materials
Physics (2002), 65(15), 155206/1-155206/7
CODEN: PRBMDO; ISSN: 0163-1829
PUBLISHER: American Physical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The dynamic Stark effect of excitons in GaN was studied using femtosecond **pump**-probe spectroscopy with various polarization configurations and pump detunings at 10 K. In contrast to 2-dimensional GaAs/AlGaAs quantum wells which have Bloch eigenstates similar to those of GaN and a large spin-orbit coupling, the Stark effect in GaN is strongly dependent on **pump** and probe relative linear polarizations. This dependence results from the small spin-orbit splitting in GaN and a mixing of A and B valence bands induced by a linearly polarized pump. Using 2 different circular polarization configurations, splitting of degenerate excitons was observed because of different optical Stark shifts. The exptl. results are explained by a simple theor. model.

REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 31 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:290162 CAPLUS
DOCUMENT NUMBER: 136:392588
TITLE: The excitonic optical Stark effect in GaN
AUTHOR(S): Choi, C. K.; Chang, Yia-Chung; Lam, J. B.; Gainer, G. H.; Shee, S. K.; Krasinski, J. S.; Song, J. J.
CORPORATE SOURCE: Center for Laser and Photonics Research, Oklahoma State University, Stillwater, OK, 74078-0444, USA
SOURCE: Physica Status Solidi A: Applied Research (2002), 190(1), 99-105
CODEN: PSSABA; ISSN: 0031-8965
PUBLISHER: Wiley-VCH Verlag Berlin GmbH
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The dynamic Stark effect of excitons in GaN at 10 K with excitation well below the excitonic resonances was studied using nondegenerate femtosecond pump-probe spectroscopy with co- and cross-linear polarization configurations. In contrast to 2-dimensional GaAs/AlGaAs quantum wells, which have Bloch eigenstates similar to those of GaN and a large spin-orbit coupling, the Stark effect in GaN is strongly dependent on the **pump** and probe relative linear polarizations. This dependence results from the small spin-orbit splitting in GaN and a mixing of the A and B valence bands induced by a linearly polarized pump.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 32 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:290161 CAPLUS
DOCUMENT NUMBER: 136:392657
TITLE: Nondegenerated pump and probe spectroscopy in InGaN-based semiconductors
AUTHOR(S): Omae, K.; Kawakami, Y.; Narukawa, Y.; Watanabe, Y.; Mukai, T.; Fujita, Sg.
CORPORATE SOURCE: Department of Electronic Science and Engineering, Kyoto University, Kyoto, 606-8501, Japan
SOURCE: Physica Status Solidi A: Applied Research (2002), 190(1), 93-98
CODEN: PSSABA; ISSN: 0031-8965
PUBLISHER: Wiley-VCH Verlag Berlin GmbH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Carrier dynamics in 2 types of InGa_N-based semiconductors were studied using nondegenerated pump and probe spectroscopy. The samples consist of an In_{0.1}Ga_{0.9}N active layer, 30 nm thick (sample a) or an In_{0.1}Ga_{0.9}N/GaN multiple quantum well with 10 periods, 3 nm/10 nm thick (sample b). Pump and probe spectroscopy revealed that photo-generated carriers pumped at 370 nm (3.350 eV) rapidly reach the bottom of levels in the active layers within a time scale of several ps for both samples. For the sample a, a pos. peak at 3.21 eV was sandwiched between 2 neg. peaks at 3.29 and 3.17 eV in the spectra of photo-induced change of absorption coefficient ($\Delta\alpha$) because Franz-Keldysh and Stark effects on excitonic absorption were almost eliminated due to the screening of internal elec. field. However, for the sample b, only neg. signals were observed in $\Delta\alpha$, indicating that the band filling of localized states plays a more important role. This is because the effect of elec. field on the optical transition property is different depending on well widths.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 33 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:820713 CAPLUS

DOCUMENT NUMBER: 136:93142

TITLE: Generation of coherent acoustic phonons in strained GaN thin films

AUTHOR(S): Huang, Yue-Kai; Chern, Gia-Wei; Sun, Chi-Kuang; Smorchkova, Yulia; Keller, Stacia; Mishra, Umesh; DenBaars, Steven P.

CORPORATE SOURCE: Department of Electrical Engineering and Graduate Institute of Electro-Optical Engineering, National Taiwan University, Taipei, 10617, Taiwan

SOURCE: Applied Physics Letters (2001), 79(20), 3361-3363
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Coherent acoustic phonon oscillations were generated and studied in strained GaN thin films. Inside the bulk GaN film, the longitudinal interference of an UV femtosecond pump pulse created periodic carrier distribution that screened out the strain-induced piezoelec. field and initiated the coherent longitudinal acoustic phonon oscillations corresponding to the carrier periods. The created coherent phonon oscillation modulated the piezoelec. field thus modified the absorption property of the GaN thin film through Franz-Keldysh effect. This time-dependent absorption modulation was reflected in the transmission variation of the followed probe pulses, resulting a long decay time .apprx.300 ps for the initiated coherent phonon oscillations.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 34 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:782543 CAPLUS

DOCUMENT NUMBER: 136:28959

TITLE: Ultrafast all optical modulation based on intersubband transition in semiconductor quantum wells

AUTHOR(S): Asano, T.; Yoshizawa, S.; Noda, S.; Iizuka, N.; Kaneko, K.; Suzuki, N.; Wada, O.

CORPORATE SOURCE: Department of Electronic Science and Engineering, Kyoto University, Sakyo-ku, 606-8501, Japan

SOURCE: Optical and Quantum Electronics (2001), 33(7/10), 963-973
CODEN: OQELDI; ISSN: 0306-8919

PUBLISHER: Kluwer Academic Publishers
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Ultrafast modulation of interband-resonant light by intersubband-resonant light in n-doped GaAs/AlGaAs and GaN/AlGaN quantum wells was investigated by femtosecond pump-probe technique. A planar-type AlGaAs/GaAs modulation device shows a modulation speed of .apprx.1 ps at room temperature. The observed modulation efficiency indicates that 99% modulation

can be achieved with a control pulse energy of .apprx.1 pJ when a waveguide-type device structure is utilized. The feasibility of the all-optical modulation in GaN/AlGaN quantum wells is also investigated. The intersubband carrier relaxation time, which mainly det. the modulation speed, is measured and is found to be extremely fast (130-170 fs). The results indicate that the optical modulation at a bit rate of over 1 Tb/s will be possible by utilizing the intersubband transition in GaN/AlGaN quantum wells. The modulation efficiency in GaN/AlGaN quantum wells is also discussed in comparison with that in GaAs/AlGaAs quantum wells.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 35 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:687575 CAPLUS

DOCUMENT NUMBER: 135:378360

TITLE: Femtosecond pump-probe spectroscopy of a highly excited GaN epilayer

AUTHOR(S): Choi, Chan-Kyung; Kwon, Yong Hwang; Krasinski, Jerzy S.; Park, Gil-Han; Setlur, Girish; Song, Jin-Joo; Chang, Yia-Chung

CORPORATE SOURCE: Center for Laser and Photonics Research and Department of Physics, Oklahoma State University, Stillwater, OK, 74078-0444, USA

SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2001), 4280(Ultrafast Phenomena in Semiconductors V), 89-95
CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The nonequil. carrier dynamics in GaN epilayer for carrier densities ranging from 4×10^{17} to 10^{19} cm⁻³ at 10 K was studied by femtosecond pump-probe transmission spectroscopy. Spectral hole burning was initially peaked roughly at the excitation energy for an estimated carrier d. of 4×10^{18} cm⁻³ and gradually red-shifted during the excitation. Because of reduced carrier-carrier and carrier-phonon scattering, a very slow energy relaxation of the hot carriers at these densities were observed. The hot carriers were strongly confined in a nonthermal distribution and they relaxed collectively to the band edge.

REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 36 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:687572 CAPLUS

DOCUMENT NUMBER: 135:377924

TITLE: Theoretical modeling of femtosecond pump-probe spectroscopy in GaN systems

AUTHOR(S): Chang, Yia-Chung; Choi, Chan-Kyung; Song, Jin-Joo

CORPORATE SOURCE: Department of Physics and Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL, 61801-3080, USA

SOURCE: Proceedings of SPIE-The International Society for

Optical Engineering (2001), 4280(Ultrafast Phenomena
in Semiconductors V), 58-69

CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The authors present theor. simulation of the fs pump-probe spectroscopy in GaN systems for photoexcitation both far below and far above the band gap. Semiconductor Bloch equations for carrier distribution and exciton polarization are solved numerically. The simulation results are compared with experiment. The experiment for both cases was performed at 10 K to study the

nonequil. carrier dynamics in bulk GaN. For pump below the band gap, prominent a.c. Stark effects are observed, and the theor. simulation gives line-shapes of the differential absorption spectra in qual. agreement with experiment. If the carrier screening and band renormalized effects are properly scaled, then good quant. agreement between theory and experiment can be obtained for various pump intensities and detuning energies. For pump far above band gap, the theor. simulation shows a fast carrier relaxation due to LO phonon emission and carrier-carrier scattering with scattering time .apprx.10-100 fs, while exptl., the hot carriers are strongly confined in a nonthermal distribution and they relaxed collectively to the band edge at a surprisingly slow rate (with relaxation time around 1 ps).

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 37 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:328863 CAPLUS

DOCUMENT NUMBER: 135:159541

TITLE: Femtosecond pump-probe spectroscopy and time-resolved photoluminescence of an InxGal-xN/GaN double heterostructure

AUTHOR(S): Choi, C. K.; Little, B. D.; Kwon, Y. H.; Lam, J. B.; Song, J. J.; Chang, Y. C.; Keller, S.; Mishra, U. K.; DenBaars, S. P.

CORPORATE SOURCE: Center for Laser and Photonics Research and Department of Physics, Oklahoma State University, Stillwater, OK, 74078-0444, USA

SOURCE: Physical Review B: Condensed Matter and Materials Physics (2001), 63(19), 195302/1-195302/7
CODEN: PRBMDO; ISSN: 0163-1829

PUBLISHER: American Physical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The authors report a study of the carrier dynamics in an In_{0.18}Ga_{0.82}N thin film photoexcited well above the band gap using nondegenerate pump-probe spectroscopy and time-resolved photoluminescence (TRPL) for carrier densities ranging from 10¹⁷ to 10¹⁹ cm⁻³ at 10 K. At carrier densities >4 × 10¹⁸ cm⁻³, optical gain occurs across the entire band tail region after .apprx.2.5 ps time delay, when the hot carriers completely fill these states. From TRPL measurements performed in the surface emission geometry, the authors observed stimulated emission (SE) with a .apprx. 28 ps decay time. Since this SE has a threshold d. of 1 × 10¹⁸ cm⁻³, which is larger than the total d. of localized states, and the SE spectra at early time delays are quite different from the spontaneous emission spectra, the authors attribute the SE to the recombination of an electron-hole plasma from renormalized band-to-band transitions.

REFERENCE COUNT: 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 38 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:313524 CAPLUS

DOCUMENT NUMBER: 135:144328
 TITLE: Pump and probe spectroscopy of InGaN multi quantum well based laser diodes
 AUTHOR(S): Kawakami, Y.; Narukawa, Y.; Omae, K.; Nakamura, S.; Fujita, S.
 CORPORATE SOURCE: Department of Electronic Science and Engineering, Kyoto University, Kyoto, 606-8501, Japan
 SOURCE: Materials Science & Engineering, B: Solid-State Materials for Advanced Technology (2001), B82(1-3), 188-193
 CODEN: MSBTEK; ISSN: 0921-5107
 PUBLISHER: Elsevier Science S.A.
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Dynamical behavior of dense carriers was assessed at room temperature (RT) in the InGaN multi quantum well (MQW) based laser diodes (LDs) by employing pump and probe (P and P) spectroscopy under the pulse width of 150 fs. The LDs are composed of In_xGa_{1-x}N-In_yGa_{1-y}N MQWs [(a), x = 0.1, y = 0.02; (b), x = 0.2, y = 0.05 and (c), x = 0.3, y = 0.05], whose stimulated emissions correspond to near UV (390 nm), violet (420 nm) and blue (440 nm), resp. The optical gain was contributed from the nearly delocalized states [the lowest-quantized MQW levels (LQL)] in (a), while it was from highly localized levels with respect to LQL by 250 meV for (b), and by 500 meV for (c). The photo-generated carriers rapidly (<1 ps) transferred to LQL, and then relaxed to the localized tail within the time-scale of several ps, giving rise to the optical gain. Such gain spectra were saturated and other bands appeared in the vicinity of LQL under higher photoexcitation.

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 39 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN
 ACCESSION NUMBER: 2001:225773 CAPLUS
 DOCUMENT NUMBER: 134:245014
 TITLE: Semiconductor laser devices
 INVENTOR(S): Okazaki, Yoji; Fukunaga, Toshiaki
 PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001085793	A2	20010330	JP 1999-257529	19990910
US 6822988	B1	20041123	US 2000-659456	20000911
US 2005100074	A1	20050512	US 2004-942975	20040917
PRIORITY APPLN. INFO.:			JP 1999-257529	A 19990910
			US 2000-659456	A3 20000911

AB The devices comprise: (1) a GaN-type semiconductor pump laser having a GaInN (or GaN) active layer; (2) a surface-emitting GaN-type semiconductor laser having a GaInNAs (or GaNAs) active layer; (3) a Brewster plate; and (4) a convex mirror, where (2)-(4) form an external resonance cavity.

L13 ANSWER 40 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN
 ACCESSION NUMBER: 2001:99757 CAPLUS
 DOCUMENT NUMBER: 134:258881
 TITLE: Radiative and nonradiative recombination processes in GaN-based semiconductors

AUTHOR(S): Kawakami, Y.; Omae, K.; Kaneta, A.; Okamoto, K.;
Izumi, T.; Saijou, S.; Inoue, K.; Narukawa, Y.; Mukai,
T.; Fujita, Sg.
CORPORATE SOURCE: Department of Electronic Science and Engineering,
Kyoto University, Kyoto, 606-8501, Japan
SOURCE: Physica Status Solidi A: Applied Research (2001),
183(1), 41-50
CODEN: PSSABA; ISSN: 0031-8965
PUBLISHER: Wiley-VCH Verlag Berlin GmbH
DOCUMENT TYPE: Journal; General Review
LANGUAGE: English

AB Time-resolved optical characterization is an indispensable tool to study
the recombination mechanisms of excitons and/or carriers based on
radiative, nonradiative, localization and many-body processes. The
authors review the instrumentation of various spectroscopic techniques for
the assessment of InxGal-xN-based semiconductors such as time-resolved
photoluminescence (TRPL), time-resolved electroluminescence (TREL),
transient grating (TG) method to probe photothermal processes, microscopic
TRPL using optical microscope, submicroscopic TRPL using scanning near
field optical microscopy (SNOM) and pump-and-probe spectroscopy for the
measurement of transient absorption/gain spectra. The obtained results
are cited in the refs.

REFERENCE COUNT: 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 41 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:83769 CAPLUS
DOCUMENT NUMBER: 134:258662
TITLE: Band-edge luminescence in quaternary AlInGaN
light-emitting diodes
AUTHOR(S): Shatalov, M.; Chitnis, A.; Adivarahan, V.; Lunev, A.;
Zhang, J.; Yang, J. W.; Fareed, Q.; Simin, G.;
Zakheim, A.; Khan, M. Asif; Gaska, R.; Shur, M. S.
CORPORATE SOURCE: Department of Electrical Engineering, University of
South Carolina, Columbia, SC, 29208, USA
SOURCE: Applied Physics Letters (2001), 78(6), 817-819
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Operation of InGaN multiple-quantum-well (MQW) light-emitting diodes
(LEDs) with quaternary AlInGaN barriers at room and elevated temps. is
reported. The devices outperform conventional GaN/InGaN MQW
LEDs, especially at high pump currents. From the measurements of
quantum efficiency and total emitted power under d.c. and pulsed pumping,
the authors show the emission mechanism for quaternary barrier MQWs to be
predominantly linked to band-to-band transitions. This is in contrast to
localized state emission observed for conventional InGaN/InGaN and GaN/InGaN
LEDs. The band-to-band recombination with an increased quantum-well depth
improves the high-current performance of the quaternary barrier MQW LEDs,
making them attractive for high-power solid-state lighting applications.

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 42 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:778347 CAPLUS
DOCUMENT NUMBER: 134:107436
TITLE: GaN light emitting diode as a
photoreflectance pump source
AUTHOR(S): Gaskill, D. K.; Holm, R. T.; Glembocki, O. J.
CORPORATE SOURCE: Naval Research Laboratory, Washington, DC, 20375, USA
SOURCE: Review of Scientific Instruments (2000), 71(11),

4341-4343

CODEN: RSINAK; ISSN: 0034-6748

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A GaN light emitting diode was used as a photoreflectance pump source to acquire optical impedance spectroscopy data. Such a pump source has the advantage of having a controllable pump wave form (intensity, modulation depth, and shape) over a broad frequency range. Given the ready availability of light emitting diodes, many different wavelengths are potentially available.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 43 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:496803 CAPLUS

DOCUMENT NUMBER: 133:302812

TITLE: Stimulated emission and pump-probe studies of wide-gap nitrides for UV-blue photonic applications

AUTHOR(S): Song, Jin-Joo; Bidnyk, Sergiy; Schmidt, Theodore J.

CORPORATE SOURCE: CLPR, Dep. Phys., Oklahoma State Univ., Stillwater, OK, USA

SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (1999), 3896(Design, Fabrication, and Characterization of Photonic Devices), 72-85
CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Stimulated Emission and Pump-Probe studies were performed in GaN, InGaN, and AlGaIn epilayers as well as GaN/AlGaIn sep. confinement heterostructures. In GaN epilayers the near-threshold gain mechanism is inelastic exciton-exciton scattering for temps. ~ 150 K, whereas at elevated temps. electron-hole plasma is the dominant gain mechanism. An anal. of the relative shift between the spontaneous emission and lasing peaks in SCH samples, combined with the temperature dependence of the lasing threshold, reveals that exciton-exciton scattering is the dominant gain mechanisms leading to low-threshold UV lasing in the GaN/AlGaIn SCH over the entire temperature range studied. The authors further performed optical pumping of AlGaIn epilayers at different temps. Stimulated emission was observed in Al_xGa_{1-x}N thin films for Al concns. as high as x is 0.26, with a resultant stimulated emission wavelength ≥ 328 nm at room temperature. This result indicated that AlGaIn-based structures are suitable not only for use in deep-UV detectors, but also as a potential source of deep-UV laser radiation. The interband optical transitions in GaN and InGaN also were studied at 10 K and room temperature using nondegenerate nanosecond optical

pump-probe techniques. At low temps., strong, well-resolved features were seen in the absorption and reflection spectra corresponding to the 1s A and B exciton transitions. Broadening and decrease in intensity of these features were studied as the function of excitation pump d. Values of induced transparency and induced absorption are extremely large in GaN epilayers. The pump-probe results in GaN epilayers were directly compared to ones obtained from InGaN films. Significant differences in near-bandedge absorption changes were clearly observed between the two materials.

REFERENCE COUNT: 52 THERE ARE 52 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 44 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:334101 CAPLUS

DOCUMENT NUMBER: 133:65673

TITLE: Femtosecond pump-probe and four-wave mixing studies of excitons in GaN
 AUTHOR(S): Jho, Young-Dahl; Kim, Dai-sik; Fischer, Art J.; Song, Jin-Joo; Kenrow, J.; El Sayed, K.; Stanton, Christopher J.
 CORPORATE SOURCE: Dep. Phys., Seoul National Univ., Seoul, S. Korea
 SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2000), 3940(Ultrafast Phenomena in Semiconductors IV), 279-286
 CODEN: PSISDG; ISSN: 0277-786X
 PUBLISHER: SPIE-The International Society for Optical Engineering
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Femtosecond pump-probe (P-P) and 4-wave mixing (FWM) expts. were performed simultaneously at 11 K on Ga nitride epilayers to study the initial temporal line-shapes of the exciton. A-B exciton beats were found in both P-P and FWM expts. near the exciton resonance. However, the differential reflection spectra showed a much slower rise time that persisted at longer neg. time delay than the FWM signal or differential transition spectra at the exciton resonance. A numerical solution of a 6. band semiconductor Bloch equation model including all Hartree Fock nonlinearities shows that this slow rise results from excitation induced dephasing, i.e., the strong d. dependence of the dephasing time which changes with the laser excitation energy.

REFERENCE COUNT: 32 THERE ARE 32 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 45 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:58296 CAPLUS
 DOCUMENT NUMBER: 132:143776

TITLE: A pump and probe study of photoinduced internal field screening dynamics in an AlGaIn/GaN single-quantum-well structure

AUTHOR(S): Shikanai, A.; Deguchi, T.; Sota, T.; Kuroda, T.; Tackeuchi, A.; Chichibu, S.; Nakamura, S.

CORPORATE SOURCE: Department of Electrical, Electronics, and Computer Engineering, Waseda University, Shinjuku, Tokyo, 169-8555, Japan

SOURCE: Applied Physics Letters (2000), 76(4), 454-456
 CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Photogenerated carrier dynamics in an AlGaIn/GaN single quantum well was studied using a conventional degenerate pump and probe technique at room temperature Photoinduced absorption at the exciton resonance was observed It is

explained by the absorption coefficient change, through the quantum-confined Stark effect and the quantum-confined Franz-Keldish effect, caused by the photoinduced internal elec.-field screening. In comparison with biased GaAs multiple quantum wells, a slower time evolution of differential transmission signals was also found. Its origin is attributed to the longer carrier sweep-out time due to the potential profile of the sample in conjunction with the longer carrier recombination time.

REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 46 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:44410 CAPLUS
 DOCUMENT NUMBER: 132:129682

TITLE: Piezoelectric field-enhanced second-order nonlinear optical susceptibilities in wurtzite GaN/AlGaIn quantum

wells
AUTHOR(S): Liu, Ansheng; Chuang, S.-L.; Ning, C. Z.
CORPORATE SOURCE: NASA Ames Research Center, Moffett Field, CA, 94035,
USA
SOURCE: Applied Physics Letters (2000), 76(3), 333-335
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Second-order nonlinear optical processes including 2nd-harmonic generation, optical rectification, and difference-frequency generation associated with intersubband transitions in wurtzite GaN/AlGa_N quantum well (QW) were studied theor. Taking into account the strain-induced piezoelec. (PZ) effects, the authors solve the electronic structure of the QW from coupled effective-mass Schrodinger equation and Poisson equation including the exchange-correlation effect under the local-d. approximation The large PZ field in the QW breaks the symmetry of the confinement potential profile and leads to large 2nd-order susceptibilities. Also the interband optical pump-induced electron-hole plasma results in an enhancement in the maximum value of the nonlinear coeffs. and a red shift of the peak position in the nonlinear optical spectrum. Using the difference-frequency generation, THz radiation can be generated from a GaN /Al_{0.75}Ga_{0.25}N with a pump laser of 1.55 μm.

REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 47 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:748923 CAPLUS

DOCUMENT NUMBER: 131:343937

TITLE: Optical nonlinearities in the band edge region of highly excited (In)Ga_N thin films studied via femtosecond and nanosecond optical pump-probe spectroscopy

AUTHOR(S): Schmidt, T. J.; Fischer, A. J.; Song, J. J.

CORPORATE SOURCE: Center Laser Photonics Research, Oklahoma State Univ., Stillwater, OK, 74078, USA

SOURCE: Physica Status Solidi B: Basic Research (1999), 216(1), 505-509

CODEN: PSSBBD; ISSN: 0370-1972

PUBLISHER: Wiley-VCH Verlag Berlin GmbH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We present the results of a detailed study of the band edge absorption changes in GaN and InGa_N thin films induced by the presence of excess photogenerated free carriers. The 1s A and B free excitonic resonances in Ga_N are shown to decrease with increasing above-gap nanosecond optical excitation due to screening by free carriers and exciton-exciton scattering. The decrease in excitonic absorption with increasing above-gap excitation is accompanied by a significant increase in the below-gap absorption coefficient To further explore this behavior, femtosecond nondegenerate optical pump-probe expts. were also performed using an amplified Ti:Al₂O₃ laser. Exciton saturation due to screening by free carriers and excitonic phase space filling was again observed, along with a modest amount of below-gap induced absorption attributed to band gap renormalization. Similar expts. were performed on InGa_N thin films. The band edge absorption changes observed in InGa_N films were found to be significantly different than those observed in Ga_N.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 48 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:656034 CAPLUS

DOCUMENT NUMBER: 131:279046
 TITLE: Hybrid light-emitting sources for efficient and cost effective white lighting and for full-color applications
 INVENTOR(S): Hide, Fumitomo; Denbaars, Steven P.; Heeger, Alan J.
 PATENT ASSIGNEE(S): The Regents of the University of California, USA
 SOURCE: U.S., 19 pp.
 CODEN: USXXAM
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5966393	A	19991012	US 1997-795190	19970204
PRIORITY APPLN. INFO.:			US 1996-32849P	P 19961213

AB Hybrid solid state light-emitting devices are described which comprise an elec.-powered solid-state inorg. light emitter capable of emitting a first output light and a photoluminescent polymer element, positioned in the first output light, which comprises a photoluminescent conjugated semiconducting polymer which is pumped by a first portion of the first emitted output of light and (when so pumped) emits a second output light which is emitted from the device with that portion of the first emitted output (if any) remaining beyond the pump portion. The inorg. light emitter may selected from a p-n junction diode-containing light emitter, a p-i-n junction triode-containing light emitter, a p-n junction laser diode light emitter, a metal-insulator-semiconductor (M-I-S)-containing light emitter, and a semiconductor quantum cascade pump source light emitter. SiC or II-VI compound The polymer element may comprise a saturated polymer mixed with luminescent dyes or a saturated polymer having a saturated main chain with luminescent dye mols. attached to the main chain via side-chains, or a conjugated semiconducting polymer is selected from conjugated semiconducting polymers with the poly(phenylenevinylene) backbone mol. structure, with the poly(phenylenevinylene) backbone mol. structure and functionalized with side chains to make it soluble in common organic solvents, with the poly(phenylene) backbone mol. structure, with the poly(phenylene) mol. structure and functionalized with side chains to make it soluble in common organic solvents, with the poly(fluorene) backbone mol. structure, and with the poly(fluorene) backbone mol. structure and functionalized with side chains to make it soluble in common organic solvents. The devices may be configured as solid-state lasers. Zn-doped InGaN.

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 49 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:655465 CAPLUS
 DOCUMENT NUMBER: 131:329144
 TITLE: Nondegenerate optical pump-probe spectroscopy of highly excited group III nitrides
 AUTHOR(S): Schmidt, T. J.; Song, J. J.; Keller, S.; Mishra, U. K.; DenBaars, S. P.; Yang, Wei
 CORPORATE SOURCE: Center for Laser and Photonics Research and Department of Physics, Oklahoma State University, Stillwater, OK, 74078, USA
 SOURCE: Materials Research Society Symposium Proceedings (1999), 572(Wide-Bandgap Semiconductors for High-Power, High-Frequency and High-Temperature Applications), 433-438
 CODEN: MRSPDH; ISSN: 0272-9172
 PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors report the results of nondegenerate optical pump-probe absorption expts. performed on GaN and InGaN thin films and quantum wells under the conditions of strong optical band to band excitation. The evolution of the band edge in these materials was monitored as the number of photoexcited free carriers was increased beyond that required to achieve population inversion and observe stimulated emission. The band edge of InGaN is shown to exhibit markedly different high excitation behavior than that of GaN, explaining in part the reduction in stimulated emission threshold that typically accompanies the incorporation of In into GaN to form InGaN. A comparison of the band edge absorption changes observed in pump-probe expts. to the gain spectra measured in variable-stripe gain expts. is also given.

REFERENCE COUNT: 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 50 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:375879 CAPLUS

DOCUMENT NUMBER: 131:206285

TITLE: Femtosecond spectroscopy in GaN with tunable UV pulses

AUTHOR(S): Ye, Hong; Wicks, Gary W.; Fauchet, Philippe M.

CORPORATE SOURCE: Dep. Phys. Astron., Univ. of Rochester, Rochester, NY, USA

SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (1999), 3624(Ultrafast Phenomena in Semiconductors III), 188-197
CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The hot electron relaxation dynamics is studied in n-type GaN films grown on sapphire by MBE. A novel femtosecond pump-probe technique is used in which the electrons are excited by an IR pump and the carrier dynamics are monitored by a tunable near UV probe. Complex transients, showing bleaching and induced absorption, are observed. The data are fitted by a model in which the LO-phonon emission is the dominant energy relaxation process. The LO-phonon emission time is 0.2 ps. Above-bandgap pump-probe expts., in which the electrons are excited by a near UV pump from the valence band and probed by a tunable near UV pulse are also performed. The carrier dynamics vary with the probe wavelengths.

REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 51 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:375878 CAPLUS

DOCUMENT NUMBER: 131:206284

TITLE: Ultrafast carrier dynamics in GaN epilayers studied by femtosecond pump-probe spectroscopy

AUTHOR(S): Fischer, Art J.; Little, Brian D.; Schmidt, Theodore J.; Choi, Chan-Kyung; Song, Jin-Joo; Horning, Robert D.; Goldenberg, Barbara L.

CORPORATE SOURCE: Cent. Laser Photonics Res., Oklahoma State Univ., Stillwater, OK, USA

SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (1999), 3624(Ultrafast Phenomena in Semiconductors III), 179-187
CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Femtosecond pump-probe measurements were performed in GaN epilayers to study carrier dynamics in the band edge region. Excitonic absorption was found to begin saturating at a pump fluence of $20 \mu\text{J}/\text{cm}^2$ which corresponds to an estimated carrier d. of $1 \times 10^{18} \text{ cm}^{-3}$. At zero delay between pump and probe, induced absorption is observed below the unpumped band gap due to ultrafast bandgap renormalization. After 375 fs, a large induced transparency is observed just below the excitonic resonance which is due to a transient electron-hole plasma. After 1 ps, the absorption has partially recovered to a level associated with excitonic phase-space filling. The absorption then recovers with a characteristic time of .apprx.20 ps, a value which increases with increasing excitation d.

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 52 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:333470 CAPLUS

DOCUMENT NUMBER: 131:94562

TITLE: Ultrafast electron dynamics study of GaN

AUTHOR(S): Sun, C.-K.; Huang, Y.-L.; Keller, S.; Mishra, U. K.; DenBaars, S. P.

CORPORATE SOURCE: Graduate Institute of Electro-Optical Engineering and Department of Electrical Engineering, National Taiwan University, Taipei, 10617, Taiwan

SOURCE: Physical Review B: Condensed Matter and Materials Physics (1999), 59(21), 13535-13538
CODEN: PRBMDO; ISSN: 0163-1829

PUBLISHER: American Physical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Ultrafast electron dynamics in n-doped GaN was studied using multiple-wavelength pump-probe techniques. A fast electron cooling with a time constant of 500 fs was observed, indicating the electron as the dominant carrier type in cooling processes. Electrons in band-tail states were found to relax at the same rate as conduction electrons, indicating fast (<500 fs) carrier capture into shallow band-tail states and fast scattering between shallow band-tail electrons and conduction band electrons. Results agree well with the band-tailing model of Chakraborty and Biswas. Impurity screening potential was thus obtained. With a variation of pump photon energy, conduction band intervalley scattering of GaN was also studied. With a proper selection of pump wavelength, the electron cooling behavior is delayed by intervalley returned electrons with a time constant .apprx.1 ps. By examining the fraction of the delayed cooling component, data suggested an intervalley scattering threshold energy of 1.34 eV, which is the separation energy between the bottom of the U valley and Γ valley conduction band min. in wurtzite GaN.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 53 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1998:616201 CAPLUS

DOCUMENT NUMBER: 129:282873

TITLE: Pump-probe spectroscopy of band tail states in metalorganic chemical vapor deposition-grown InGaN

AUTHOR(S): Schmidt, T. J.; Cho, Yong-Hoon; Gainer, G. H.; Song, J. J.; Keller, S.; Mishra, U. K.; DenBaars, S. P.

CORPORATE SOURCE: Center for Laser and Photonics Research and Department of Physics, Oklahoma State University, Stillwater, OK, 74078-0444, USA

SOURCE: Applied Physics Letters (1998), 73(13), 1892-1894
CODEN: APPLAB; ISSN: 0003-6951

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Nanosecond nondegenerate optical pump-probe expts. were performed on InGaN thin films and InGaN/GaN multiple quantum wells. Bleaching of absorption of the localized band tail states was observed with increasing excitation d. (Iexc) of the pump pulse. The dynamics of the bleaching depends on the localization depth of the band tail states and on Iexc. With high Iexc, large blue-shifts in the spontaneous emission luminescence peaks were also observed, the magnitude of which was again found to depend on the localization depth of the band tail states. Stimulated emission is observed from the samples with increasing Iexc and correlates with significant changes in the behavior of the absorption bleaching. The observed bleaching dynamics of the band tail states are well explained by considering the effective lifetime of the band tail states as measured by time-resolved photoluminescence expts.

REFERENCE COUNT: 32 THERE ARE 32 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 54 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1998:143213 CAPLUS

TITLE: Semiconducting polymer lasers.

AUTHOR(S): Hide, F.; Diaz-Garcia, M. A.; McGehee, M. D.; DenBaars, S. P.; Heeger, A. J.

CORPORATE SOURCE: Materials Research Laboratory, University California, Santa Barbara, CA, 93106, USA

SOURCE: Book of Abstracts, 215th ACS National Meeting, Dallas, March 29-April 2 (1998), POLY-028. American Chemical Society: Washington, D. C.
CODEN: 65QTAA

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Because of their high absorption coeffs., high d. of chromophores, and Stokes-shifted luminescence, semiconducting luminescent polymers have potential as low-threshold laser media. Optically pumped laser emission in the solid-state has been demonstrated with submicron thick films of π -conjugated polymers as the active material. Resonant structures appropriate for photopumped lasers include microcavities, distributed feedback (DFB) substrates, and whispering-gallery mode microdisks. Photopumped stimulated emission and lasing have been observed in a growing number of highly luminescent polymers with emission wavelengths spanning the visible spectrum. Photopumped lasing thresholds as low as 60 nJ per 10 ns pulse (1 mm + 200 μ m) have been observed in the DFB configuration. A current research focus is directed toward demonstration of diode lasers by elec. pumping the polymer active layer. On the other hand, the self-pumped heterostructure is a monolithically integrated device that contains a blue emitting GaN-based light emitting diode (LED) which optically pumps a semiconducting polymer laser above threshold. The self-pumped heterostructure has the potential of realizing surface-emitting lasers of all colors with one elec. drive scheme.

L13 ANSWER 55 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1998:15941 CAPLUS

DOCUMENT NUMBER: 128:95156

TITLE: Visible light emitting devices including UV-light emitting diode and UV-excitabile, visible light emitting phosphor, and method of producing such device

INVENTOR(S): Mensz, Piotr M.; Stanton, Douglas A.; Taskar, Nikhil

PATENT ASSIGNEE(S): Philips Electronics N.V., Neth.; Philips Norden AB

SOURCE: PCT Int. Appl., 24 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9748138	A2	19971218	WO 1997-IB606	19970528
WO 9748138	A3	19980219		
W: JP				
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 856202	A2	19980805	EP 1997-920917	19970528
R: DE, FR, GB, NL				
JP 11510968	T2	19990921	JP 1998-501390	19970528
PRIORITY APPLN. INFO.:			US 1996-661520	A 19960611
			WO 1997-IB606	W 19970528

AB Visible displays and lamps are described which comprise phosphor screens using ≥ 1 UV-stimulable phosphors and UV-emitting GaN-based diodes (LEDs). Resonant cavities may be incorporated into the LED structures to both narrow and heighten the emission spectrum. Color displays may be produced from arrays of individual LED-phosphor combinations of different colors. Fabrication of the devices may entail depositing a phosphor/photoresist mixture on an LED array, patterning the coating so that the LEDs are each associated with either a phosphor layer or are exposed, and repeating the process with further coating using different phosphors to produce a desired pattern. The LED pumped phosphor devices do not require a vacuum environment and operate at much lower voltages than the electron beam pumped phosphor screens of cathode ray tubes (CRTs).

L13 ANSWER 56 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:547553 CAPLUS

DOCUMENT NUMBER: 127:227088

TITLE: Spontaneous emission from a quantum-well GaN/InGaN/AlGaIn heterostructure at high pump currents

AUTHOR(S): Akimova, I. V.; Eliseev, P. G.; Osinskii, M. A.; Perlin, P.

CORPORATE SOURCE: Fiz. Inst. im. P. N. Lebedeva, RAN, Moscow, Russia

SOURCE: Kvantovaya Elektronika (Moscow) (1996), 23(12), 1069-1071

CODEN: KVEKA3; ISSN: 0368-7147

PUBLISHER: Radio i Svyaz

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB A study was made of the electroluminescence spectra of a structure with an InxGa1-xN (3 nm thick) quantum well pumped by current pulses of up to 4 kA/cm² d. at T = 77 K and 300 K. Considerable spectral broadening ($\Delta E = 150-200$ meV) of nonthermal nature was observed. A preliminary study was made of the stability of this light-emitting structure pumped by high-current pump pulses.

L13 ANSWER 57 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:723808 CAPLUS

DOCUMENT NUMBER: 126:110640

TITLE: Observation of room temperature surface-emitting stimulated emission from GaN:Ge by optical pumping

AUTHOR(S): Zhang, X.; Kung, P.; Saxler, A.; Walker, D.; Razeghi, M.

CORPORATE SOURCE: Center Quantum Devices, Northwestern University, Evanston, IL, 60208, USA

SOURCE: Journal of Applied Physics (1996), 80(11), 6544-6546

CODEN: JAPIAU; ISSN: 0021-8979

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Optically pumped surface-emitting stimulated emission at room temperature was observed from GaN:Ge grown by metalorg. CVD. The sample was optically pumped perpendicularly on the top surface while the stimulated emission was collected from the back colinearly with the pump beam. The cavity was formed by the GaN/air and GaN/sapphire interfaces without any other structure. The stimulated emission was gain guided by the pump beam. The threshold optical pump d. for stimulated emission was .apprx.2.8 MW/cm² and the linewidth was 2.5 nm. The emission from GaN:Ge showed a red shift as the pump d. increased. The comparison between theor. calcns. and probably many-body interactions can account well for the red shift.

L13 ANSWER 58 OF 156 CAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:571350 CAPLUS

DOCUMENT NUMBER: 125:289824

TITLE: Characterization of AlGaInN heterostructures grown by OMVPE

AUTHOR(S): Bour, D. P.; Chung, H. F.; Gotz, W.; Romano, L.; Krusor, B. S.; Ponce, F. A.; Johnson, N. M.; Bringans, R. D.

CORPORATE SOURCE: XEROX Palo Alto Res. Center, Electronic Materials Lab., Palo Alto, CA, 94304, USA

SOURCE: Proceedings - Electrochemical Society (1996), 96-11(III-V Nitride Materials and Processes), 37-45
CODEN: PESODO; ISSN: 0161-6374

PUBLISHER: Electrochemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors describe the OMVPE growth and characterization of AlGaInN and its heterostructures, including measurements of elec. properties (Hall), optical properties (photo- and cathodoluminescence), structural characteristics (x-ray diffraction and TEM); and also the emission of (In,Ga)N/(Al,Ga)N heterostructures subject to optical and elec. pumping.

L13 ANSWER 59 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2006(20):7302 COMPENDEX

TITLE: Nanosecond excitonic spin relaxation in cubic GaN.

AUTHOR: Tackeuchi, Atsushi (Department of Applied Physics Waseda University, Tokyo 169-8555, Japan); Otake, Hirotaka; Ogawa, Yusuke; Ushiyama, Takafumi; Fujita, Taisuke; Takano, Fumiyoshi; Akinaga, Hiro

SOURCE: Applied Physics Letters v 88 n 16 Apr 17 2006 2006.,
arn: 162114

CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2006

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical

LANGUAGE: English

AN 2006(20):7302 COMPENDEX

AB The excitonic spin relaxation process in cubic GaN is observed by spin-dependent pump and probe reflectance measurements with subpicosecond time resolution. The spin polarization presents at temperatures lower than 100 K. The spin relaxation times at 15-75 K are found to be longer than 5 ns and short spin relaxation times on the picosecond order are not present. Although these long spin relaxation times are in striking contrast to the subpicosecond spin relaxation of A-band free excitons in hexagonal GaN, they are consistent with the dependence that spin relaxation time becomes longer for wider-band gap zinc blende semiconductors. \$CPY 2006 American Institute of Physics. 30 Refs.

L13 ANSWER 60 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2006(8):7176 COMPENDEX
TITLE: White LEDs fabricated by photon recycling.
AUTHOR: Horng, Ray-Hua (Institute of Precision Engineering
National Chung Hsing University, Taichung 402,
Taiwan); Su, Ying-Yong; Lee, Chia-En; Hung, Shao-Hua;
Lin, Wen-Yu; Pan, Kuan-Fu; Yang, Chiao-Chih; Wu,
Dong-Sing
MEETING TITLE: 207th Meeting of the Electrochemical Society.
MEETING LOCATION: Quebec, Canada
MEETING DATE: 15 May 2005-20 May 2005
SOURCE: Meeting Abstracts 2005.p 492
SOURCE: 207th Meeting of the Electrochemical Society - Meeting
Abstracts
ISSN: 1091-8213
PUBLICATION YEAR: 2005
MEETING NUMBER: 66443
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical
LANGUAGE: English

AN 2006(8):7176 COMPENDEX

AB We report the fabrication of the white LED. The white LED consisted of a GaN-based blue LED and a GaN-based green LED individually bonded to an AlGaInP active region by SOG (spin-on glass) material show in Fig.1. The color sensor of human eye is consist of three types color-sensitive of receptors or cones, so white light can also be generated by mixing three discrete colors in the red, green, and blue primary. Here, we employ the GaN-based blue and green LEDs, to pump the AlGaInP material and red light was obtained. The emission dominant wavelengths are at 465 nm, 545 nm, and 626 nm. To avoid the light absorption by the GaAs substrate for the AlGaInP active region growth, the GaAs substrate was removed by selective wet chemical etching. When the shorter wavelength photons emitted from GaN-based LED, some of the photons are absorbed by AlGaInP active region and re-emitted a light at a longer wavelength. Then the GaN-based LED can generate dichromatic colors in a single LED chip. We clustered two kinds of dichromatic LED chip in a packaging lamp. The chip dimension is 1200 μm x 1200 μm large area with 90 μm thick sapphire substrate. It generated near white light when the red, green, and blue light sources were mixed. The spectrum diagram of white light is shown in Fig.2. The color of white light of the coordinate of the CIE chromaticity diagram at various operating current is shown in Fig.3. It was found that the coordinate of the CIE changes as the injection current changes. It could be attributed to the fact that the LED junction temperature arises as the injection current increasing. It results in the photon recycling efficiency decreasing. As concerning this point, it can be overcome by flip-chip package.

L13 ANSWER 61 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2006(6):4159 COMPENDEX
TITLE: Long-lived, coherent acoustic phonon oscillations in GaN single crystals.
AUTHOR: Wu, S. (Department of Physics and Astronomy Laboratory for Laser Energetics University of Rochester, Rochester, NY 14623); Geiser, P.; Jun, J.; Karpinski, J.; Park, J.-R.; Sobolewski, Roman
SOURCE: Applied Physics Letters v 88 n 4 2006.p 1-3, arn: 041917
CODEN: APPLAB ISSN: 0003-6951
PUBLICATION YEAR: 2006
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2006(6):4159 COMPENDEX

AB We report on coherent acoustic phonon (CAP) oscillations studied in high-quality bulk GaN single crystals with a two-color femtosecond optical pump-probe technique. Using a far-above-the-band gap ultraviolet excitation ([similar to]270 nm wavelength) and a near-infrared probe beam ([similar to]810 nm wavelength), the long-lived, CAP transients were observed within a 10 ns time-delay window between the pump and probe pulses, with a dispersionless (proportional to the probe-beam wave vector) frequency of [similar to]45 GHz. The measured CAP attenuation corresponded directly to the absorption of the probe light in bulk GaN, indicating that the actual (intrinsic) phonon-wave attenuation in our crystals was significantly smaller than the measured 65.8 cm⁻¹ value. The velocity of the phonon propagation was equal to the velocity of sound in GaN. \$CPY 2006 American Institute of Physics. 16 Refs.

L13 ANSWER 62 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(38):8751 COMPENDEX
TITLE: Enhanced second- and third-harmonic generation and induced photoluminescence in a two-dimensional GaN photonic crystal.
AUTHOR: Coquillat, Dominique (Groupe d'Etude des Semiconducteurs UMR 5650 CNRS-Universit Montpellier II, 34095 Montpellier Cedex 5, France); Vecchi, Gabriele; Comaschi, Carlo; Malvezzi, Andrea Marco; Torres, Jrmi; Le Vassor D'Yerville, Marine
SOURCE: Applied Physics Letters v 87 n 10 Sep 5 2005 2005.p 1-3
CODEN: APPLAB ISSN: 0003-6951
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English

AN 2005(38):8751 COMPENDEX

AB We observed visible second-harmonic and ultraviolet third-harmonic fields generated in reflection from the surface of a two-dimensional triangular GaN/sapphire photonic crystal. When the pump radiation resonates with a photonic mode, enhancement factors as high as 250 and 3500 occurred for the second- and third-harmonic signals, respectively, as compared to the unpatterned GaN slab. The very large increase of third-harmonic field, with a photon energy exceeding that of the electronic band gap, was used as an efficient mechanism to induce GaN photoluminescence. \$CPY 2005 American Institute of Physics. 15 Refs.

L13 ANSWER 63 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(30):671 COMPENDEX
TITLE: Ultrafast intersubband relaxation in GaN/AlN MQWs.
AUTHOR: Hamazaki, J. (Department of Physics Sophia University, Chiyoda-ku, Tokyo, Japan); Ikuno, K.; Takahashi, H.; Kunugita, H.; Ema, K.; Kikuchi, A.; Kishino, K.
MEETING TITLE: Ultrafast Phenomena in Semiconductors and Nanostructure.
MEETING ORGANIZER: SPIE
MEETING LOCATION: San Jose, CA, United States
MEETING DATE: 24 Jan 2005-27 Jan 2005
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 5725 2005.p 265-274
SOURCE: Ultrafast Phenomena in Semiconductors and Nanostructure Materials IX
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 2005
MEETING NUMBER: 65185
DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical

LANGUAGE: English

AN 2005(30):671 COMPENDEX

AB We have investigated the ultrafast relaxation dynamics of intersubband transition (ISBT) in **GaN/AlN**, using a two-color **pump**-probe technique, in a wide energy range around the optical communication wavelength. We suggest that the origin of the signal depends on the relation between the pump and probe pulse energies. We have observed an ultrafast induced absorption signal and a slow negative component which are due to the absorption of electrons during intra-subband scattering and a carrier cooling process with a hot-phonon effect, respectively. Moreover, we clarify the origin of the inhomogeneous broadening width of the ISBT and of the intrinsic absorption width of ISBT from the detailed analyses of the result. We have reproduced the relaxation dynamics by a numerical calculation to confirm this interpretation of ISBT relaxation dynamics. 19 Refs.

L13 ANSWER 64 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(27):7165 COMPENDEX

TITLE: Dynamic polarization filtering in anisotropically strained M -plane GaN films.

AUTHOR: Omae, K. (Paul-Drude-Institut fur Festkorperelektronik, 10117 Berlin, Germany); Flissikowski, T.; Misra, P.; Brandt, O.; Grahn, H.T.; Kojima, K.; Kawakami, Y.

SOURCE: Applied Physics Letters v 86 n 19 May 9 2005 2005.p 1-3

CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2005(27):7165 COMPENDEX

AB The dynamic optical polarization filtering for anisotropically strained M -plane **GaN** films on LiAl O₂ is investigated by **pump** and probe spectroscopy. Due to a very large polarization anisotropy in the absorption coefficient, these films exhibit an intrinsic polarization filtering, which appears as a rotation of the polarization vector after transmission of linearly polarized light through the film. For dynamic filtering, the polarization rotation is controlled by the pump, since the photoexcited carriers remove the intrinsic linear dichroism by selective bleaching of the anisotropic absorption. The dynamic behavior of the polarization rotation is mainly determined by the redistribution of holes between the two uppermost valence bands and by the recombination time. The latter is comparable to the measured decay time of the dynamic rotation of about 15 ps. For M -plane GaN films, the maximum dynamic rotation reaches 35deg , while the maximum static polarization rotation is about 40deg . \$CPY 2005 American Institute of Physics. 10 Refs.

L13 ANSWER 65 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(26):3360 COMPENDEX

TITLE: Measurement of second order susceptibilities of GaN and AlGaN.

AUTHOR: Sanford, N.A.; Davydov, A.V.; Tsvetkov, D.V.; Dmitriev, A.V.; Keller, S.; Mishra, U.K.; Denbaars, S.P.; Park, S.S.; Han, J.Y.; Molnar, R.J.

SOURCE: Journal of Applied Physics v 97 n 5 2005.p 1-13

CODEN: JAPIAU ISSN: 0021-8979

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2005(26):3360 COMPENDEX

AB Rotational Maker fringes, scaled with respect to χ_{11} (2) of crystalline quartz, were used to determine the second order susceptibilities χ_{11} (2) and χ_{33} (2) for samples of thin Al_xGa_{1-x}N films, a thicker GaN film, and a free-standing GaN platelets. The pump wavelength was 1064 nm. The Al_xGa_{1-x}N samples, ranging in thickness from roughly 0.5 to 4.4 μm , were grown by metalorganic chemical vapor deposition (MOCVD) and hydride vapor-phase epitaxy (HVPE) on (0001) sapphire substrates. The Al mole fractions x were 0, 0.419, 0.507, 0.618, 0.660, and 0.666, for the MOCVD-grown samples, and $x=0$, 0.279, 0.363, and 0.593 for the HVPE-grown samples. An additional HVPE-grown GaN sample 70 μm thick was also examined. The free-standing bulk GaN platelets consisted of an HVPE grown film 226 μm thick removed from its growth substrate, and a crystal 160 μm thick grown by high-pressure techniques. For the Al_xGa_{1-x}N samples, the magnitudes of χ_{11} (2) and χ_{33} (2) decrease roughly linearly with increasing x and extrapolate to 0 for $x=1$. Furthermore, the constraint expected for a perfect wurtzite structure, namely χ_{33} (2) = -2 χ_{11} (2), was seldom observed, and the samples with $x=0.660$ and $x=0.666$ showed χ_{11} (2) and χ_{33} (2) having the same sign. These results are consistent with the theoretical studies of nonlinear susceptibilities for AlN and GaN performed by Chen [Appl. Phys. Lett. 66, 1129 (1995)]. The thicker bulk GaN samples displayed a complex superposition of high- and low-frequency Maker fringes due to the multiple-pass interference of the pump and second-harmonic generation beams, and the nonlinear coefficients were approximately consistent with those measured for the thin-film GaN sample. \$CPY 2005 American Institute of Physics. 32 Refs.

L13 ANSWER 66 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(20):7681 COMPENDEX

TITLE: Optical phonon sidebands of electronic intersubband absorption in strongly polar semiconductor heterostructures.

AUTHOR: Wang, Z. (Max-Born-Inst. Nichtlineare Opt./K., 12489 Berlin, Germany); Reimann, K.; Woerner, M.; Elsaesser, T.; Hofstetter, D.; Hwang, J.; Schaff, W.J.; Eastman, L.F.

SOURCE: Physical Review Letters v 94 n 3 Jan 28 2005 2005.p 1-4

CODEN: PRLTAO ISSN: 0031-9007

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2005(20):7681 COMPENDEX

AB We present the first evidence for a distinct optical phonon progression in the linear and nonlinear intersubband absorption spectra of electrons in a GaN/Al_{0.8}Ga_{0.2}N heterostructure. Femtosecond two-color pump-probe experiments in the midinfrared reveal spectral holes on different vibronic transitions separated by the LO-phonon frequency. These features wash out with a decay time of 80 fs due to spectral diffusion. The remaining nonlinear transmission changes decay with a time constant of 380 fs. All results observed are described by the independent boson model. \$CPY 2005 The American Physical Society. 32 Refs.

L13 ANSWER 67 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2005(19):3211 COMPENDEX

TITLE: Make light, not heat: Toward higher efficiency nitride semiconductor ultraviolet optical sources.

AUTHOR: Wraback, M. (U.S. Army Research Laboratory Sensors and Electron Devices Direct. AMSRL-SE-EM, Adelphi, MD 20783, United States); Garrett, G.A.; Sampath, A.V.;

MEETING TITLE: Collins, C.J.; Shen, H.
Optically Based Biological and Chemical Sensing for
Defence.
MEETING ORGANIZER: SPIE; European Office of Aerospace Research and
Development; QinetiQ, UK; Sira, UK
MEETING LOCATION: London, United Kingdom
MEETING DATE: 25 Oct 2004-28 Oct 2004
SOURCE: Proceedings of SPIE - The International Society for
Optical Engineering v 5617 2004.p 209-220
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 2004
MEETING NUMBER: 64637
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical
LANGUAGE: English

AN 2005(19):3211 COMPENDEX

AB We have used subpicosecond time-resolved photoluminescence (TRPL) downconversion techniques to study the interplay of carrier localization and radiative and nonradiative processes in the active regions of light emitting III-nitride semiconductor ultraviolet optical sources, with the goal of identifying potential approaches that will lead to higher radiative efficiency. Comparison of TRPL in (In)AlGaIn multiple quantum well active regions indicate that for addition of only 0.01 In content the PL decay time in an InAlGaIn MQW is more than double that in an AlGaIn MQW designed to emit at the same wavelength (360 nm), thus indicating the importance of indium for improvement of material quality, most likely through the suppression of point defects. This result is further underscored by TRPL data on 320 nm InAlGaIn MQW active regions, which exhibit longer PL lifetimes than expected for growth on GaN templates with dislocation densities in the mid- 10^8cm^{-2} range. While the PL lifetimes in these InAlGaIn MQWs improve for growth on lower dislocation density HVPE bulk GaN substrates, a similar phenomenon is not observed for deposition on nearly dislocation-free bulk AlN substrates, suggesting that defect generation in the MQWs associated with lattice mismatch or AlN surface preparation may play an important role. The pump intensity dependence of the time zero signal and the TRPL decays in the MQWs implies that internal electric field-induced recombination through the barriers and interface states plays an important role in the radiative efficiency of quantum well active regions for c-axis oriented materials and devices. The effect of these internal electric fields can be mitigated through the use of nonpolar MQWs. The combination of more intense time-integrated PL spectra and shorter PL lifetimes with decreasing well width in GaN/AlGaIn MQWs grown on a-plane LEO GaN for low pump intensity suggests that the radiative lifetime becomes shorter due to the accompanying increase in exciton binding energy and oscillator strength at smaller well width in these high quality samples. Finally, it is demonstrated that compositional fluctuations in AlGaIn active regions grown by plasma-assisted MBE can be employed to create spatial localization that enhances the luminescence efficiency and PL lifetime (300-400 ps) despite high defect density ($>10^{10}\text{cm}^{-2}$) by inhibiting movement of carriers to nonradiative sites. Significant enhancement of this phenomenon has been obtained in a DH LED structure grown on a lower defect density (mid- 10^9cm^{-2}) AlGaIn template, with PL lifetime increased by nearly a factor of two, corresponding to a defect density in the mid- 10^7cm^{-2} range, and only a 3.3 times drop in PL intensity when the temperature is raised from 12 K to room temperature, suggesting up to 30% internal quantum efficiency. 43 Refs.

L13 ANSWER 68 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(49):5829 COMPENDEX

TITLE: Subpicosecond exciton spin relaxation in GaN.

AUTHOR: Kuroda, T. (Department of Applied Physics Waseda

University, Tokyo 169-8555, Japan); Yabushita, T.; Kosuge, T.; Tackeuchi, A.; Taniguchi, K.; Chinone, T.; Horio, N.
SOURCE: Applied Physics Letters v 85 n 15 Oct 11 2004 2004.p 3116-3118
CODEN: APPLAB ISSN: 0003-6951
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English

AN 2004(49):5829 COMPENDEX

AB The spin-relaxation process of A-band exciton in GaN is observed by spin-dependent pump and probe reflectance measurement with subpicosecond time resolution. The spin-relaxation times at 150-225 K are 0.47-0.25 ps. These are at least one order of magnitude shorter than those of the other III-V compound semiconductors. The spin-relaxation time τ is found to be proportional to $T^{-1/4}$, where T is the temperature. \$CPY 2004 American Institute of Physics. 24 Refs.

L13 ANSWER 69 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(34):5893 COMPENDEX

TITLE: Mechanisms of optical gain in cubic GaN and InGaN.

AUTHOR: Holst, J. (Technische Universitat Berlin, 10623 Berlin, Germany); Hoffmann, A.; Broser, I.; Frey, T.; Schottker, B.; As, D.J.; Schikora, D.; Lischka, K.

SOURCE: MRS Internet Journal of Nitride Semiconductor Research v 4 n SUPPL.1 1999.p 6d
CODEN: MIJNF7 ISSN: 1092-5783

PUBLICATION YEAR: 1999

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical

LANGUAGE: English

AN 2004(34):5893 COMPENDEX

AB The epitaxial growth of zinc-blende (cubic) GaN and InGaN on GaAs with a common cleavage plane and readily high-quality, low-cost wafers may be considered as an alternative approach for the future realization of cleaved laser cavities. To obtain detailed information about the potential of cubic GaN and InGaN for device applications we performed optical gain spectroscopy accompanied by time-integrated and time-dependent photoluminescence measurements at 2 K and 300 K. From intensity-dependent gain measurements, the identification of the gain processes was possible. For moderate excitation levels, the biexciton decay is likely to be responsible for a gain structure at 3.265 eV in cubic GaN [10]. For the highest pump intensities, the electron-hole-plasma is the dominant gain process, providing gain values up to 200 cm⁻¹. Furthermore cubic GaN samples with different cavity lengths from 250 to 600 μ m were cleaved to investigate the influence of the sample geometry on the gain mechanisms. In these samples increased gain values up to 150 cm⁻¹ as well as lower threshold excitation densities were observed, indicating the potential of cubic GaN for device applications. The results of GaN will be compared with intensity-dependent gain measurements on InGaN samples, grown on GaAs with varying In-content. The observed gain mechanisms in cubic InGaN will be discussed in detail. 19 Refs.

L13 ANSWER 70 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(18):10757 COMPENDEX

TITLE: Femtosecond intersubband dynamics of electrons in AlGaIn/GaN-based high-electron-mobility transistors.

AUTHOR: Wang, Z. (Max-Born-Inst. Nichtlineare Optik/K., 12489 Berlin, Germany); Reimann, K.; Woerner, M.; Elsaesser, T.; Hofstetter, D.; Hwang, J.; Schaff, W.J.; Eastman, L.F.

SOURCE: Semiconductor Science and Technology v 19 n 4 SPEC.
ISS. April 2004 2004.p S463-S464
CODEN: SSTEET ISSN: 0268-1242

PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2004(18):10757 COMPENDEX
AB Ultrafast electron dynamics in the inversion layer of an AlGaIn/GaN transistor is studied in **pump**-probe experiments with 50 fs mid-infrared pulses. Two-colour pump-probe measurements show an instantaneous transmission increase for all spectral positions of the probe, which demonstrates that homogeneous broadening is an important contribution to the total linewidth in this material. We observe the maximum of the induced transmission change around 5 μm . This large Stokes shift might be caused by the extremely large electron-LO-phonon scattering rate. 6 Refs.

L13 ANSWER 71 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(14):4081 COMPENDEX
TITLE: Femtosecond intersubband dynamics of electrons in AlGaIn/GaN high-electron-mobility transistors.
AUTHOR: Wang, Z. (Max-Born-Institut fur NOK, 12489 Berlin, Germany); Reimann, K.; Woerner, M.; Elsaesser, T.; Hofstetter, D.; Hwang, J.; Schaff, W.J.; Eastman, L.F.
MEETING TITLE: Trends in Optics and Photonics Series: Quantum electronics and Laser Science (QELS).
MEETING ORGANIZER: APS/Division of Laser Science; IEEE/Lasers and Electro-Optics Society; Optical Society of America
MEETING LOCATION: Baltimore, MD., United States
MEETING DATE: 01 Jun 2003-06 Jun 2003
SOURCE: Conference on Quantum Electronics and Laser Science (QELS) - Technical Digest Series v 89 2003.p QThM2/1-QThM2/2, (IEEE cat n CH37420-TBR)
PUBLICATION YEAR: 2003
MEETING NUMBER: 62538
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2004(14):4081 COMPENDEX
AB Ultrafast electron dynamics in the inversion layer of an AlGaIn/GaN transistor is studied in **pump**-probe experiments with 50-fs midinfrared pulses. el-e2 intersubband scattering and thermalization occur within 200 fs. \$CPY@2002 Optical Society of America. 4 Refs.

L13 ANSWER 72 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(9):1710 COMPENDEX
TITLE: Sensors and Actuators A: Physical.
MEETING TITLE: Micromechanics Section of Sensors and Actuators, based on.
MEETING LOCATION: Kyoto, Japan
MEETING DATE: 19 Jan 2003-23 Jan 2003
SOURCE: Sensors and Actuators, A: Physical v 111 n 1 Mar 1 2004 2004. 141p
CODEN: SAAPEB ISSN: 0924-4247
PUBLICATION YEAR: 2004
MEETING NUMBER: 62256
DOCUMENT TYPE: Conference Proceedings
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2004(9):1710 COMPENDEX
AB The proceedings contains 21 papers from the conference on Sensors and

actuators A: Physical. The topics discussed include: heterogeneous integration of CdS filters with GaN LEDs for fluorescence detection microsystems; a micropump operating with chemically produced oxygen gas; 3D microfabrication with inclined/rotated UV lithography; investigation of the dye concentration influence on the lasing wavelength and threshold for a micro fluidic dye laser; establishment of basic process to fabricate full GaAs cantilever for scanning probe microscope applications; and the multiple sample injector using improved sheath flow to prevent sample dilution.(Edited abstract)

L13 ANSWER 73 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2003(2):274 COMPENDEX

TITLE: Ultrashort hole capture time in Mg-doped GaN thin films.

AUTHOR: Lin, Kung-Hsuan (Department of Electrical Engineering Grad. Inst. of Electro-Optical Eng. National Taiwan University, Taipei 10617, Taiwan); Chern, Gia-Wei; Chu, Shi-Wei; Sun, Chi-Kuang; Xing, Huili; Smorchkova, Yulia; Keller, Stacia; Mishra, Umesh; DenBaars, Steven P.

SOURCE: Applied Physics Letters v 81 n 21 Nov 18 2002 2002.p 3975-3977

CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 2002

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2003(2):274 COMPENDEX

AB A brief description about ultrashort hole capture time in Mg-doped GaN thin films was presented. Femtosecond pump-probe technique was used for the purpose. The hole capture time was found to be shorter than 10 ps. It was found that as the hole excess energy decreases, the hole capture time increases. Results also showed that the hole capture time decreases with increased doping concentrations.(Edited abstract) 20 Refs.

L13 ANSWER 74 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2002(46):3926 COMPENDEX

TITLE: The excitonic optical Stark effect in GaN.

AUTHOR: Choi, C.K. (Center for Laser and Photonics Res. Oklahoma State University, Stillwater, OK 74078-0444, United States); Chang, Y.C.; Lam, J.B.; Shee, S.K.; Krasinski, J.S.; Song, J.J.

MEETING TITLE: Ultrafast Phenomena in Semiconductors VI.

MEETING ORGANIZER: SPIE

MEETING LOCATION: San Jose, CA, United States

MEETING DATE: 21 Jan 2002-25 Jan 2002

SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 4643 2002.p 139-147

CODEN: PSISDG ISSN: 0277-786X

PUBLICATION YEAR: 2002

MEETING NUMBER: 60140

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2002(46):3926 COMPENDEX

AB We report experimental and theoretical studies of the excitonic optical Stark effect in GaN photoexcited below the excitonic resonances with various polarization configurations and pump detunings, using nondegenerate pump-probe spectroscopy at 10 K. We observed that the Stark effect in GaN is strongly dependent on pump and probe relative linear polarizations. We found that this dependence results from

the small spin-orbit splitting in GaN and a mixing of A and B valence bands induced by a linearly polarized pump. Using two different circular polarization configurations, we also observed splitting of degenerate excitons because of different optical Stark shifts. Our experimental results are explained by a simple theoretical model. 23 Refs.

L13 ANSWER 75 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2002(17):1491 COMPENDEX
TITLE: The excitonic optical stark effect in GaN.
AUTHOR: Choi, Chan Kyung (Center for Laser and Photonics Res. Oklahoma State University, Stillwater, OK 74078-0444, United States); Chang, Yia-Chung; Lam, J.B.; Gainer, G.H.; Shee, S.K.; Krasinski, J.S.; Song, J.J.
SOURCE: Physica Status Solidi (A) Applied Research v 190 n 1 March 2002 2002.p 99-105
CODEN: PSSABA ISSN: 0031-8965
PUBLICATION YEAR: 2002
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2002(17):1491 COMPENDEX

AB The dynamic Stark effect of excitons in GaN at 10 K with excitation well below the excitonic resonances was studied using nondegenerate femtosecond pump-probe spectroscopy with co- and cross-linear polarization configurations. In contrast to two-dimensional GaAs/AlGaAs quantum wells, which have Bloch eigenstates similar to those of GaN and a large spin-orbit coupling, we observed that the Stark effect in GaN is strongly dependent on the **pump** and probe relative linear polarizations. We found that this dependence results from the small spin-orbit splitting in GaN and a mixing of the A and B valence bands induced by a linearly polarized pump. 19 Refs.

L13 ANSWER 76 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2001(46):441 COMPENDEX
TITLE: Intersubband transitions in the communications wavelength range (λ [similar to] 1.55 μm) in GaN/AlGaIn multiple quantum wells.
AUTHOR: Gmachl, C. (Bell Laboratories Lucent Technologies, Murray Hill, NJ 07974, United States); Ng, H.M.; Frolov, S.V.; Chu, S.-N.G.; Cho, A.Y.
MEETING TITLE: Conference on Lasers and Electro-Optics (CLEO).
MEETING ORGANIZER: Optical Society of America; IEEE/ LEOS Lasers and Electro Optics Society; American Physical Society
MEETING LOCATION: Baltimore, MD, United States
SOURCE: Conference on Lasers and Electro-Optics Europe - Technical Digest 2001.p 56-57
CODEN: 85PNA9
PUBLICATION YEAR: 2001
MEETING NUMBER: 58609
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2001(46):441 COMPENDEX

AB The intersubband transitions in the communications wavelength range with peak absorption wavelength were presented. Multiple quantum well (MQW) samples were grown by molecular beam epitaxy on sapphire substrate with buffer layers of varying composition and thickness. The samples contained 15 nominally identical repetitions and a GaN buffer layer. Conventional **pump**-probe technique was used to measure the intersubband electron scattering time. (Edited abstract) 4 Refs.

L13 ANSWER 77 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2001(45):2886 COMPENDEX
TITLE: Ultrafast all optical modulation based on intersubband transition in semiconductor quantum wells.
AUTHOR: Asano, T. (Dept. of Electronic Science and Eng. Kyoto University, Kyoto 6068501, Japan); Yoshizawa, S.; Noda, S.; Iizuka, N.; Kaneko, K.; Suzuki, N.; Wada, O.
SOURCE: Optical and Quantum Electronics v 33 n 7-10
July/October 2001 2001.p 963-973
CODEN: OQELDI ISSN: 0306-8919
PUBLICATION YEAR: 2001
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English

AN 2001(45):2886 COMPENDEX

AB Ultrafast modulation of interband-resonant light by intersubband-resonant light in n-doped GaAs/AlGaAs and GaN/AlGaN quantum wells was investigated by femtosecond pump-probe technique. A planar-type AlGaAs/GaAs modulation device shows a modulation speed of [similar to]1 ps at room temperature. The observed modulation efficiency indicates that 99% modulation can be achieved with a control pulse energy of [similar to]1 pJ when a waveguide-type device structure is utilized. The feasibility of the all-optical modulation in GaN/AlGaN quantum wells is also investigated. The intersubband carrier relaxation time, which mainly determines the modulation speed, is measured and is found to be extremely fast (130-170 fs). The results indicate that the optical modulation at a bit rate of over 1 Tb/s will be possible by utilizing the intersubband transition in GaN/AlGaN quantum wells. The modulation efficiency in GaN/AlGaN quantum wells is also discussed in comparison with that in GaAs/AlGaAs quantum wells. 19 Refs.

L13 ANSWER 78 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2001(35):1711 COMPENDEX
TITLE: Theoretical modeling of femtosecond pump-probe spectroscopy in GaN systems.
AUTHOR: Chang, Y.C. (Department of Physics Materials Research Laboratory Univ. Illinois Urbana-Champaign, Urbana, IL 61801-3080, United States); Choi, C.K.; Song, J.J.
MEETING TITLE: Ultrafast Phenomena in Semiconductors V.
MEETING ORGANIZER: SPIE
MEETING LOCATION: San Jose, CA, United States
MEETING DATE: 25 Jan 2001-26 Jan 2001
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 4280 2001.p 58-69
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 2001
MEETING NUMBER: 58323
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2001(35):1711 COMPENDEX

AB We present theoretical simulation of the femtosecond pump-probe spectroscopy in GaN systems for photoexcitation both far below and far above the band gap. Semiconductor Bloch equations for carrier distribution and exciton polarization are solved numerically. The simulation results are compared with experiment. The experiment for both cases was performed at 10 K to study the non-equilibrium carrier dynamics in bulk GaN. For pump below the band gap, prominent AC Stark effects are observed, and the theoretical simulation gives line-shapes of the differential absorption spectra in qualitative agreement with experiment. If the carrier screening and band renormalized effects are properly scaled, then good quantitative agreement between theory and experiment can be obtained for various pump intensities and detuning energies. For pump

far above band gap, the theoretical simulation shows a fast carrier relaxation due to LO phonon emission and carrier-carrier scattering with scattering time on the order of 10-100 fs, while experimentally, we find that the hot carriers are strongly confined in a non-thermal distribution and they relaxed collectively to the band edge at a surprisingly slow rate (with relaxation time around 1ps). 11 Refs.

L13 ANSWER 79 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2001(4):4320 COMPENDEX
TITLE: Thermionic emission dominated carrier dynamics in InGaN/GaN multiple-quantum-wells.
AUTHOR: Sun, Chi-Kuang (Nat'l Taiwan Univ, Taipei, Taiwan); Liang, Jian-Chin; Yu, Xiang-Yang; Abare, Amber; DenBaars, Steven P.
MEETING TITLE: Quantum Electronics and Laser Science Conference (QELS 2000).
MEETING ORGANIZER: APS/Division of Laser Science; IEEE/Lasers and Electro-Optics Society; Optical Society of America
MEETING LOCATION: San Francisco, CA, USA
MEETING DATE: 07 May 2000-12 May 2000
SOURCE: Conference on Quantum Electronics and Laser Science (QELS) - Technical Digest Series 2000. p 257-258, IEEE, Piscataway, NJ, USA, 00CB37089
CODEN: 002097
PUBLICATION YEAR: 2000
MEETING NUMBER: 57599
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2001(4):4320 COMPENDEX
AB InGaN/GaN multiple-quantum-wells (MQWs) have drawn great attentions due to the demonstrated performance of InGaN MQW blue-UV light-emitting diodes and laser diodes. This article discusses the study of the carrier dynamics in InGaN/GaN MQWs by using femtosecond **pump**-probe transmission measurements. 5 Refs.

L13 ANSWER 80 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2000(16):3793 COMPENDEX
TITLE: Stimulated emission and pump-probe studies of wide-gap nitrides for UV-blue photonic applications.
AUTHOR: Song, Jin-Joo (Oklahoma State Univ, Stillwater, OK, USA); Bidnyk, Sergiy; Schmidt, Theodore J.
MEETING TITLE: Proceedings of the 1999 Design, Fabrication, and Characterization of Photonic Devices.
MEETING ORGANIZER: SPIE; Nanyang Technological Univeristy
MEETING LOCATION: Singapore, Singapore
MEETING DATE: 30 Nov 1999-03 Dec 1999
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 3896 1999.p 72-85
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 1999
MEETING NUMBER: 56259
DOCUMENT TYPE: Journal
TREATMENT CODE: Application; Experimental
LANGUAGE: English
AN 2000(16):3793 COMPENDEX
AB Stimulated Emission and Pump-Probe studies were performed in GaN, InGaN, and AlGaIn epilayers as well as GaN/AlGaIn separate confinement heterostructures (SCHs). We show that in GaN epilayers the near-threshold gain mechanism is inelastic exciton-exciton scattering for temperatures below approx.150 K, whereas at elevated temperatures electron-hole plasma is the dominant gain mechanism. An analysis of the relative shift between

the spontaneous emission and lasing peaks in SCH samples, combined with the temperature dependence of the lasing threshold, reveals that exciton-exciton scattering is the dominant gain mechanism leading to low-threshold ultraviolet lasing in the GaN/AlGaIn SCH over the entire temperature range studied. We further performed optical pumping of AlGaIn epilayers at different temperatures. Stimulated emission has been observed in Al_xGa_{1-x}In thin films for Al concentrations as high as x equals 0.26, with a resultant stimulated emission wavelength as low as 328 nm at room temperature. This result indicated that AlGaIn-based structures are suitable not only for use in deep-ultraviolet detectors, but also as a potential source of deep-ultraviolet laser radiation. The interband optical transitions in GaN and InGaIn have also been studied at 10 K and room temperature using nondegenerate nanosecond optical pump-probe techniques. At low temperatures, strong, well-resolved features were seen in the absorption and reflection spectra corresponding to the 1s A and B exciton transitions. Broadening and decrease in intensity of these features were studied as the function of excitation pump density. We found that values of induced transparency and induced absorption are extremely large in GaN epilayers. The pump-probe results in GaN epilayers were directly compared to ones obtained from InGaIn films. Significant differences in near-band-edge absorption changes were clearly observed between the two materials. (Author abstract) 51 Refs.

L13 ANSWER 81 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2000(11):3786 COMPENDEX
 TITLE: Mechanisms of optical gain in cubic GaN and InGaIn.
 AUTHOR: Holst, J. (Technische Universitaet Berlin, Berlin, Ger); Hoffmann, A.; Broser, I.; Frey, T.; Schoettker, B.; As, D.J.; Schikora, D.; Lischka, K.
 MEETING TITLE: Proceedings of the 1998 MRS Fall Meeting - Symposium on 'GaN and Related Alloys'.
 MEETING ORGANIZER: U.S.Army Research Office; Hewlett-Packard; Matsushita Electric Industrial Co., Ltd.; Sandia National Laboratories
 MEETING LOCATION: Boston, MA, USA
 MEETING DATE: 30 Nov 1998-04 Dec 1998
 SOURCE: Materials Research Society Symposium - Proceedings v 537 1999.p G2.3
 CODEN: MRSPDH ISSN: 0272-9172
 PUBLICATION YEAR: 1999
 MEETING NUMBER: 55983
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Experimental
 LANGUAGE: English

AN 2000(11):3786 COMPENDEX

AB The epitaxial growth of zinc-blende (cubic) GaN and InGaIn on GaAs with a common cleavage plane and readily high-quality, low-cost wafers may be considered as an alternative approach for the future realization of cleaved laser cavities. To obtain detailed information about the potential of cubic GaN and InGaIn for device applications we performed optical gain spectroscopy accompanied by time-integrated and time-dependent photoluminescence measurements at 2 K and 300 K. From intensity-dependent gain measurements, the identification of the gain processes was possible. For moderate excitation levels, the biexciton decay is likely to be responsible for a gain structure at 3.265 eV in cubic GaN. For the highest pump intensities, the electron-hole-plasma is the dominant gain process, providing gain values up to 200 cm⁻¹. Furthermore cubic GaN samples with different cavity lengths from 250 to 600 μm were cleaved to investigate the influence of the sample geometry on the gain mechanisms. In these samples increased gain values up to 150 cm⁻¹ as well as lower threshold excitation densities were observed, indicating the potential of cubic GaN for device applications. The results

of GaN will be compared with intensity-dependent gain measurements on InGaN samples, grown on GaAs with varying In-content. The observed gain mechanisms in cubic InGaN will be discussed in detail. (Author abstract) 11 Refs.

L13 ANSWER 82 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 1999(49):4686 COMPENDEX
TITLE: Ultrafast carrier dynamics in GaN epilayers studied by femtosecond pump-probe spectroscopy.
AUTHOR: Fischer, A.J. (Oklahoma State Univ, Stillwater, OK, USA); Little, B.D.; Schmidt, T.J.; Choi, C.K.; Song, J.J.; Horning, R.; Goldenberg, B.
MEETING TITLE: Proceedings of the 1999 Ultrafast Phenomena in Semiconductors III.
MEETING ORGANIZER: SPIE
MEETING LOCATION: San Jose, CA, USA
MEETING DATE: 27 Jan 1999-29 Jan 1999
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 3624 1999.p 179-187
CODEN: PSISDG ISSN: 0277-786X
ISBN: 0-8194-3094-3
PUBLICATION YEAR: 1999
MEETING NUMBER: 55272
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 1999(49):4686 COMPENDEX
AB Femtosecond pump-probe measurements were performed in GaN epilayers to study carrier dynamics in the band edge region. Excitonic absorption was found to begin saturating at a pump fluence of 20 $\mu\text{J}/\text{cm}^2$ which corresponds to an estimated carrier density of 1 multiplied by 10^{18} cm^{-3} . At zero delay between pump and probe, induced absorption is observed below the unpumped band gap due to ultrafast bandgap renormalization. After 375 fs, a large induced transparency is observed just below the excitonic resonance which is due to a transient electron-hole plasma. After 1 ps, the absorption has partially recovered to a level associated with excitonic phase-space filling. The absorption then recovers with a characteristic time of approx. 20 ps, a value which increases with increasing excitation density. (Author abstract) 21 Refs.

L13 ANSWER 83 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 1998(35):4740 COMPENDEX
TITLE: Large optical nonlinearities near the bandgap of MOCVD-grown GaN thin films.
AUTHOR: Schmidt, T.J. (Oklahoma State Univ, Stillwater, OK, USA); Song, J.J.; Chang, Y.C.; Horning, R.; Goldenberg, B.
MEETING TITLE: Proceedings of the 1998 International Quantum Electronics Conference.
MEETING ORGANIZER: IEEE
MEETING LOCATION: San Francisco, CA, USA
MEETING DATE: 03 May 1998-08 May 1998
SOURCE: Technical Digest - European Quantum Electronics Conference 1998. IEEE, Piscataway, NJ, USA, 98CH36236.p 240-241
CODEN: 001671
PUBLICATION YEAR: 1998
MEETING NUMBER: 48584
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English

AN 1998(35):4740 COMPENDEX

AB The effects of high densities of excess free carriers on the optical transitions near the band edge of wurtzite **GaN** are studied via nondegenerate nanosecond optical **pump**-probe transmission and reflection experiments performed on GaN thin films grown by metallo-organic chemical vapor deposition (MOCVD) on (0001)-oriented sapphire. At low temperatures, strong, well-resolved features are present in the absorption and reflection spectra corresponding to A and B free-exciton transitions. These features broaden and decrease in intensity due to the presence of high densities of photoexcited free carriers generated by the pump beam, resulting in extremely large values of induced transparency. 5 Refs.

L13 ANSWER 84 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 1998(24):6203 COMPENDEX

TITLE: Semiconducting polymer lasers.

AUTHOR: Hide, F. (Univ of California at Santa Barbara, Santa Barbara, CA, USA); Diaz-Garcia, M.A.; McGehee, M.D.; DenBaars, S.P.; Heeger, A.J.

MEETING TITLE: Proceedings of the 1998 Dallas Meeting.

MEETING LOCATION: Dallas, TX, USA

MEETING DATE: 29 Mar 1998-02 Apr 1998

SOURCE: Polymer Preprints, Division of Polymer Chemistry, American Chemical Society v 39 n 1 Mar 1998. ACS, Washington, DC, USA. p 69

CODEN: ACPPAY ISSN: 0032-3934

PUBLICATION YEAR: 1998

MEETING NUMBER: 48259

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Experimental

LANGUAGE: English

AN 1998(24):6203 COMPENDEX

AB Because of their high absorption coefficients, high density of chromophores, and Stokes-shifted luminescence, semiconducting luminescent polymers have potential as low-threshold laser media. Optically pumped laser emission in the solid state has been demonstrated with submicron thick films of pi-conjugated polymers as the active material. Resonant structures appropriate for photopumped lasers include microactivities, distributed feedback (DFB) substrates, and whispering-gallery mode microdisks. Photopumped stimulated emission and lasing have been observed in a growing number of highly luminescent polymers with emission wavelengths spanning the visible spectrum. Photopumped lasing thresholds as low as 60 nJ per 10 ns pulse (1 mm multiplied by 200 microm) have been observed in the DFB configuration. A current research focus is directed toward demonstration of diode lasers by electrically pumping the polymer active layer. On the other hand, the self-pumped heterostructure is a monolithically integrated device that contains the blue emitting **GaN**-based light emitting diode (LED) which optically **pumps** a semiconducting polymer laser above threshold. The self-pumped heterostructure has the potential of realizing surface-emitting lasers of all colors with one electrical drive scheme. (Author abstract)

L13 ANSWER 85 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 1996(48):3494 COMPENDEX

TITLE: Light emission properties of GaN-based double heterostructures and quantum wells.

AUTHOR: Loeber, D.A.S. (Univ of Massachusetts at Amherst, Amherst, MA, USA); Redwing, J.M.; Anderson, N.G.; Tischler, M.A.

MEETING TITLE: Proceedings of the 1995 MRS Fall Meeting.

MEETING ORGANIZER: MRS

MEETING LOCATION: Boston, MA, USA

MEETING DATE: 27 Nov 1995-01 Dec 1995
SOURCE: 1st International Symposium on Gallium Nitride and
Related Materials Materials Research Society Symposium
Proceedings v 395 1996. Materials Research Society,
Pittsburgh, PA, USA. p 949-954
CODEN: MRSPDH ISSN: 0272-9172
PUBLICATION YEAR: 1996
MEETING NUMBER: 44427
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English

AN 1996(48):3494 COMPENDEX

AB Edge emission characteristics of optically pumped GaN-AlGa_N double heterostructures and quantum wells are examined. The samples, which were grown by metallorganic vapor phase epitaxy, are photoexcited with light from a pulsed nitrogen laser. The pump light is focused to a narrow stripe on the sample surface, oriented perpendicular to a cleaved edge, and the edge luminescence is collected and analyzed. We first compare emission characteristics of highly excited GaN-AlGa_N double heterostructures grown simultaneously on SiC and sapphire substrates. Polarization resolved spectral properties of edge luminescence from both structures is studied as a function of pump intensity and excitation stripe length. Characteristics indicative of stimulated emission are observed, particularly in the sample grown on SiC. We then present results demonstrating laser emission from a GaN-AlGa_N separate-confinement quantum-well heterostructure. At high pump intensities, band edge emission from the quantum well exhibits five narrow (approx. 1 angstrom) modes which are evenly spaced by 10 angstrom to within the resolution of the spectrometer. This represents the first demonstration of laser action in a GaN-based quantum-well structure. (Author abstract) 12 Refs.

L13 ANSWER 86 OF 156 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 1995(9):378 COMPENDEX

TITLE: Vertical-cavity stimulated emission from photopumped InGa_N/GaN heterojunctions at room temperature.

AUTHOR: Khan, M. Asif (APA Optics Inc, Blaine, MN, USA);
Krishnankutty, S.; Skogman, R.A.; Kuznia, J.N.; Olson,
D.T.; George, T.

SOURCE: Applied Physics Letters v 65 n 5 Aug 1 1994. p 520-521
CODEN: APPLAB ISSN: 0003-6951

PUBLICATION YEAR: 1994

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 1995(9):378 COMPENDEX

AB In this paper, investigation on the vertical cavity stimulated emission from an In_{0.25}Ga_{0.75}N/GaN single heterojunction was reported for the first time. Similar to earlier studies, the stimulated emission from the In_{0.25}Ga_{0.75}N/GaN heterojunction exhibited a nonlinear dependence on input optical pump power density and a characteristic line narrowing. The quality of the material was sufficiently high to yield stimulated emission with a cavity length of 4.1 μm and mirror reflectivities of about 20%. Line narrowing, nonlinear dependence of output intensity on input optical power density, and a sharp threshold, suggestive of stimulated emission, were clearly observed in the violet emission. This work was relevant on the realization of violet/blue injection lasers based on GaN/InGa_N heterojunctions. 5 Refs.

L13 ANSWER 87 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8904013 INSPEC

TITLE: Nanosecond excitonic spin relaxation in cubic GaN

AUTHOR: Tackeuchi, A.; Otake, H.; Ogawa, Y.; Ushiyama, T.;
Fujita, T.; (Dept. of Appl. Phys., Waseda Univ.,
Tokyo, Japan), Takano, F.; Akinaga, H.
SOURCE: Applied Physics Letters (17 April 2006), vol.88,
no.16, p. 162114-1-3, 30 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20060417)88:16L:162114:NESR;1-F
Price: 0003-6951/2006/88(16)/162114/3/\$23.00
Doc.No.: S0003-6951(06)21916-8
Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2006:8904013 INSPEC

AB The excitonic spin relaxation process in cubic GaN is observed
by spin-dependent pump and probe reflectance measurements with
subpicosecond time resolution. The spin polarization presents at
temperatures lower than 100 K. The spin relaxation times at 15-75 K are
found to be longer than 5 ns and short spin relaxation times on the
picosecond order are not present. Although these long spin relaxation
times are in striking contrast to the subpicosecond spin relaxation of
A-band free excitons in hexagonal GaN, they are consistent with the
dependence that spin relaxation time becomes longer for wider-band gap
zinc blende semiconductors

L13 ANSWER 88 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8867709 INSPEC

TITLE: Ultrafast intersubband relaxation in GaN/AlN MQWs

AUTHOR: Hamazaki, J.; Ikuno, K.; Takahashi, H.; Kunugita, H.;
Ema, K.; (Dept. of Phys., Sophia Univ., Tokyo,
Japan), Kikuchi, A.; Kishino, K.

SOURCE: Proceedings of the SPIE - The International Society
for Optical Engineering (2005), vol.5725, no.1, p.
265-74, 19 refs.

CODEN: PSISDG, ISSN: 0277-786X

SICI: 0277-786X(2005)5725:1L:265:UIRM;1-U

Price: 0277-786X/2005/\$14.00

Published by: SPIE-Int. Soc. Opt. Eng, USA

Conference: Ultrafast Phenomena in Semiconductors and
Nanostructure Materials IX, San Jose, CA, USA, 24 Jan.
2005

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: Theoretical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 2006:8867709 INSPEC

AB We have investigated the ultrafast relaxation dynamics of intersubband
transition (ISBT) in GaN/AlN, using a two-color pump
-probe technique, in a wide energy range around the optical communication
wavelength. We suggest that the origin of the signal depends on the
relation between the pump and probe pulse energies. We have observed an
ultrafast induced absorption signal and a slow negative component which
are due to the absorption of electrons during intra-subband scattering
and a carrier cooling process with a hot-phonon effect, respectively.
Moreover, we clarify the origin of the inhomogeneous broadening width of
the ISBT and of the intrinsic absorption width of ISBT from the detailed
analyses of the result. We have reproduced the relaxation dynamics by a
numerical calculation to confirm this interpretation of ISBT relaxation
dynamics

L13 ANSWER 89 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8821079 INSPEC
TITLE: Femtosecond intersubband dynamics of electrons in AlGaIn/GaN-based high-electron-mobility transistors
AUTHOR: Wang, Z.; Reimann, K.; Woerner, M.; Elsaesser, T.; (Max-Born-Inst. fur Nichtlineare Opt. und Kurzzeitspektroskopie, Berlin, Germany), Hofstetter, D.; Hwang, J.; Schaff, W.J.; Eastman, L.F.
SOURCE: Semiconductor Science and Technology (April 2004), vol.19, no.4, p. S463-4, 6 refs.
CODEN: SSTEET, ISSN: 0268-1242
SICI: 0268-1242(200404)19:4L.s463:FIDE;1-M
Price: 0268-1242/04/040463+02\$30.00
Doc.No.: S0268-1242(04)72462-1
Published by: IOP Publishing, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Application; Experimental
COUNTRY: United Kingdom
LANGUAGE: English
AN 2006:8821079 INSPEC
AB Ultrafast electron dynamics in the inversion layer of an AlGaIn/GaN transistor is studied in pump-probe experiments with 50 fs mid-infrared pulses. Two-colour pump-probe measurements show an instantaneous transmission increase for all spectral positions of the probe, which demonstrates that homogeneous broadening is an important contribution to the total linewidth in this material. We observe the maximum of the induced transmission change around 5 μm . This large Stokes shift might be caused by the extremely large electron-LO-phonon scattering rate

L13 ANSWER 90 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2006:8816359 INSPEC
TITLE: Sub-picosecond spin relaxation in GaN
AUTHOR: Kuroda, T.; Yabushita, T.; Kosuge, T.; Tackeuchi, A.; (Dept. of Appl. Phys., Waseda Univ., Tokyo, Japan), Taniguchi, K.; Chinone, T.; Horio, N.
SOURCE: AIP Conference Proceedings (2005), no.772, pt.1, p. 299-300, 9 refs.
CODEN: APCPCS, ISSN: 0094-243X
SICI: 0094-243X(2005)772:1L.299:PSR;1-S
Price: 0094-243X/2005/\$22.50
Published by: AIP, USA
Conference: Physics of Semiconductors. 27th International Conference on the Physics of Semiconductors. ICPS-27, Flagstaff, AZ, USA, 26-30 July 2004
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English
AN 2006:8816359 INSPEC
AB The spin relaxation process of A-band exciton in GaN is observed for the first time, to our knowledge, by spin dependent pump and probe reflectance measurement with sub-picoseconds time resolution. The spin relaxation times at 150-225 K are measured to be 0.47-0.25 ps. These are at least one order of magnitude shorter than those of the other III-V compound semiconductors. The spin relaxation time, τ_s is found to be proportional to $T^{-1.4}$, where T is the temperature

L13 ANSWER 91 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2006:8797048 INSPEC
TITLE: Hot carrier dynamics and carrier-phonon interaction in GaN

AUTHOR: Kyhm, K.; (Res. Center for Dielectric & Adv. Matter Phys., Pusan Nat. Univ., Busan, South Korea), Taylor, R.A.; Cain, N.J.
SOURCE: Journal of the Korean Physical Society (Sept. 2005), vol.47, suppl.iss, p. S356-9, 10 refs.
CODEN: KPSJAS, ISSN: 0374-4884
SICI: 0374-4884(200509)47+issL.s356:CDGP;1-K
Published by: Korean Phys. Soc, South Korea
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
COUNTRY: Korea, Democratic Peoples Republic of
LANGUAGE: English

AN 2006:8797048 INSPEC

AB The dynamics of carriers in **GaN** epilayers is investigated by using femtosecond **pump**-probe spectroscopy. After the residual chirp on the continuum probe is removed, the normalized difference spectra (NDS) for different probe energies are synchronized, recovering the full time resolution of our laser pulse. Our Monte-Carlo simulation agrees well with the unchirped NDS spectrum, which shows the development of the carrier distribution at early times, where phonon satellites are seen, together with a strong non-thermal electron distribution in the region of the LO-phonon energy arising from the remarkably strong electron-LO phonon interaction. By employing a new technique which involves the integration of the normalized NDS multiplied by the corresponding energy, a measure of the mean energy of the carriers in non-thermal states is obtained. By comparing the time-dependent energy loss with the theoretical energy loss rate, we estimate the effective temperature of the phonon modes as well as the population of phonons

L13 ANSWER 92 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:8775875 INSPEC

TITLE: Long-lived, coherent acoustic phonon oscillations in GaN single crystals

AUTHOR: Wu, S.; (Dept. of Phys., Univ. of Rochester, NY, USA), Geiser, P.; Jun, J.; Karpinski, J.; Park, J.-R.; Sobolewski, R.

SOURCE: Applied Physics Letters (23 Jan. 2006), vol.88, no.4, p. 41917-1-3, 15 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(20060123)88:4L.41917:LLCA;1-8

Price: 0003-6951/2006/88(4)/041917-1(3)/\$23.00

Doc.No.: S0003-6951(06)02005-5

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2006:8775875 INSPEC

AB We report on coherent acoustic phonon (CAP) oscillations studied in high-quality bulk **GaN** single crystals with a two-color femtosecond optical **pump**-probe technique. Using a far-above-the-band gap ultraviolet excitation (270 nm wavelength) and a near-infrared probe beam (810 nm wavelength), the long-lived, CAP transients were observed within a 10 ns time-delay window between the pump and probe pulses, with a dispersionless (proportional to the probe-beam wave vector) frequency of 45 GHz. The measured CAP attenuation corresponded directly to the absorption of the probe light in bulk GaN, indicating that the actual (intrinsic) phonon-wave attenuation in our crystals was significantly smaller than the measured 65.8 cm⁻¹ value. The velocity of the phonon propagation was equal to the velocity of sound in GaN

L13 ANSWER 93 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2006:8749868 INSPEC
 TITLE: Ultrafast intersubband relaxation dynamics in
GaN/AlN multiple quantum wells using two-color
pump-probe technique
 AUTHOR: Hamazaki, J.; Ikuno, K.; Takahashi, H.; Kunugita, H.;
 Ema, K.; (Dept. of Phys., Sophia Univ., Tokyo,
 Japan), Kikuchi, A.; Kishino, K.
 SOURCE: 2005 European Quantum Electronics Conference (IEEE
 Cat. No. 05TH8796), 2005, p. 179 of xviii+374 pp., 2
 refs.
 ISBN: 0 7803 8973 5
 Price: 0-7803-8973-5/05/\$20.00
 Published by: IEEE, Piscataway, NJ, USA
 Conference: 2005 European Quantum Electronics
 Conference, Munich, Germany, 12-17 June 2005
 DOCUMENT TYPE: Conference; Conference Article
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 2006:8749868 INSPEC
 AB This study investigates the detail of ultrafast intersubband relaxation
 dynamics in **GaN/AlN** quantum wells. The experiment uses a two-color
pump-probe technique at room temperature. Results show the temporal
 traces of the change in the transmittance of the probe pulses

L13 ANSWER 94 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2006:8697553 INSPEC
 TITLE: Femtosecond pump-probe spectroscopy of propagating
 coherent acoustic phonons in **InxGal-xN/GaN**
 heterostructures
 AUTHOR: Rongliang Liu; Sanders, G.D.; Stanton, C.J.; (Dept.
 of Phys., Univ. of Florida, Gainesville, FL, USA),
 Chang Sub Kim; Yahng, J.S.; Jho, Y.D.; Yee, K.J.; Oh,
 E.; Kim, D.S.
 SOURCE: Physical Review B (Condensed Matter and Materials
 Physics) (15 Nov. 2005), vol.72, no.19, p.
 195335-1-11, 22 refs.
 CODEN: PRBMDO, ISSN: 0163-1829
 SICI: 0163-1829(20051115)72:19L:195335:FPPS;1-1
 Price: 0163-1829/2005/72(19)/195335(11)/\$23.00
 Doc.No.: S0163-1829(05)14039-9
 Published by: APS through AIP, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Theoretical; Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 2006:8697553 INSPEC
 AB We show that large amplitude coherent acoustic phonon wave packets can be
 generated and detected in **InxGal-xN/GaN** epilayers and
 heterostructures in femtosecond **pump-probe** differential
 reflectivity experiments. The amplitude of the coherent phonon increases
 with increasing indium fraction *x* and unlike other coherent phonon
 oscillations, both amplitude and period are strong functions of the laser
 probe energy. The amplitude of the oscillation is substantially and
 almost instantaneously reduced when the wave packet reaches a
GaN-sapphire interface below the surface indicating that the phonon wave
 packets are useful for imaging below the surface. A theoretical model is
 proposed which fits the experiments well and helps to deduce the strength
 of the phonon wave packets. Our model shows that localized coherent
 phonon wave packets are generated by the femtosecond pump laser in the
 epilayer near the surface. The wave packets then propagate through a **GaN**

layer changing the local index of refraction and, as a result, modulate the reflectivity of the probe beam. Our model correctly predicts the experimental dependence on probe wavelength as well as epilayer thickness

L13 ANSWER 95 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8582594 INSPEC
DOCUMENT NUMBER: A2005-22-4280W-002; B2005-11-4110-015
TITLE: Deep bandtail states picosecond intensity-dependent carrier dynamics of GaN epilayer under high excitation
AUTHOR: Guo, B.; (State Key Lab. of Modern Opt. Instrum., Zhejiang Univ., China), Qiu, Z.R.; Lin, J.Y.; Jiang, H.X.; Wong, K.S.
SOURCE: Applied Physics B (Lasers and Optics) (April 2005), vol.B80, no.4-5, p. 521-6, 28 refs.
CODEN: APBOEM, ISSN: 0946-2171
SICI: 0946-2171(200504)B80:4/5L.521:DBSP;1-A
Published by: Springer-Verlag, Germany
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Germany
LANGUAGE: English

AN 2005:8582594 INSPEC DN A2005-22-4280W-002; B2005-11-4110-015

AB Picosecond carrier dynamics of deep bandtail states (3.1 eV) in an unintentionally n-doped GaN epilayer at room temperature under high excitation densities (i.e., $N_0=1.0+1019-1.1+1020\text{cm}^{-3}$) have been investigated with nondegenerate femtosecond pump-probe (267/400 nm) reflectance ($\Delta R/R_0$). All $\Delta R/R_0$ traces possess a 2 ps buildup time that represents an overall time for the initial non-thermal carrier population to relax towards the continuum extremes and then into the probed tail states. We observe a saturation of $\Delta R/R_0$ initial (first 10 ps) recovery rate γ_i at a density of $5-6+1019\text{ cm}^{-3}$ close to the Mott transition threshold obtained from time-integrated PL measurements. Such a saturation phenomenon has been identified as the trap-bottleneck due to the bandtail states and deep traps. As N_0 is further increased, γ_i accelerates due to the onset of Auger recombination as the trap-bottleneck becomes effective. The best fit by the Auger model for N_0 in the range of the mid-1019-1020 cm^{-3} yields an Auger coefficient of $\text{Ca } 5.0+10-30\text{cm}^6\text{s}^{-1}$

L13 ANSWER 96 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8574239 INSPEC
DOCUMENT NUMBER: A2005-21-4265K-010; B2005-11-4340K-001
TITLE: Enhanced second- and third-harmonic generation and induced photoluminescence in a two-dimensional GaN photonic crystal
AUTHOR: Coquillat, D.; (Groupe d'Etude des Semiconducteurs, CNRS-Univ. Montpellier, France), Vecchi, G.; Comaschi, C.; Malvezzi, A.M.; Torres, J.; d'Yerville, M.L.V.
SOURCE: Applied Physics Letters (5 Sept. 2005), vol.87, no.10, p. 101106-1-3, 15 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20050905)87:10L.101106:ESTH;1-Q
Price: 0003-6951/2005/87(10)/101106-1(3)/\$22.50
Doc.No.: S0003-6951(05)07135-4
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2005:8574239 INSPEC DN A2005-21-4265K-010; B2005-11-4340K-001

AB We observed visible second-harmonic and ultraviolet third-harmonic fields generated in reflection from the surface of a two-dimensional triangular

GaN/sapphire photonic crystal. When the **pump** radiation resonates with a photonic mode, enhancement factors as high as 250 and 3500 occurred for the second- and third-harmonic signals, respectively, as compared to the unpatterned GaN slab. The very large increase of third-harmonic field, with a photon energy exceeding that of the electronic band gap, was used as an efficient mechanism to induce GaN photoluminescence

L13 ANSWER 97 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8545115 INSPEC

DOCUMENT NUMBER: A2005-19-7855-065

TITLE: Electron-hole plasma Mott transition and stimulated emission in GaN

AUTHOR: Kyhm, K.; (Sch. of Phys., Pusan Nat. Univ., Busan, South Korea), Taylor, R.A.; Ryan, J.F.; Beaumont, B.; Gibart, P.

SOURCE: Journal of the Korean Physical Society (Dec. 2004), vol.45, suppl.iss, p. S526-9, 8 refs.

CODEN: KPSJAS, ISSN: 0374-4884

SICI: 0374-4884(200412)45+issL.s526:EHPM;1-J

Published by: Korean Phys. Soc, South Korea

Conference: 12th Seoul International Symposium on the Physics of Semiconductors and Applications 2004, Gyungju, South Korea, 14-16 March 2004

DOCUMENT TYPE: Conference Article; Journal

TREATMENT CODE: Experimental

COUNTRY: Korea, Democratic Peoples Republic of

LANGUAGE: English

AN 2005:8545115 INSPEC DN A2005-19-7855-065

AB We present femtosecond pump-probe reflectance measurements of excitons in GaN for various **pump** intensities. Saturation of the excitonic absorption with increasing carrier density has been measured in the case of resonant and non-resonant excitations during the rising times, and the exciton bleaching densities for various excitation energies have also been measured. We found that the resonant excitons are bleached at higher densities (10 times) than the non-resonant excitons due to the absence of free carriers. The stimulated emission mechanism is investigated by measuring simultaneously the photoluminescence and the time-resolved reflectance near the band edge, over a range of excitation densities. The onset of the stimulated emission coincides with the bleaching density of the non-resonant excitons as well as a theoretical gain threshold density. These results suggest that the stimulated emission in GaN is due to the electron-hole plasma

L13 ANSWER 98 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8457077 INSPEC

DOCUMENT NUMBER: A2005-15-6322-001

TITLE: Generation of terahertz monochromatic acoustic phonon pulses by femtosecond optical excitation of a gallium nitride/aluminium nitride superlattice

AUTHOR: Martinez, C.E.; Stanton, N.M.; Walker, P.M.; Kent, A.J.; Novikov, S.V.; Foxon, C.T. (Sch. of Phys. & Astron., Univ. of Nottingham, UK)

SOURCE: Applied Physics Letters (30 May 2005), vol.86, no.22, p. 221915-1-3, 14 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(20050530)86:22L.221915:GTMA;1-#

Price: 0003-6951/2005/86(22)/221915-1(3)/\$22.50

Doc.No.: S0003-6951(05)03923-9

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2005:8457077 INSPEC DN A2005-15-6322-001

AB We describe the generation of pulses of monochromatic acoustic phonons by ultrafast laser excitation of a gallium nitride/aluminium nitride superlattice (SL). The SL response to the optical excitation was studied using femtosecond pump-probe measurements. Superconducting bolometers were used to detect the phonons that leak out of the SL and propagate across the substrate. We see that, for excitation wavelengths around 430 nm, a pronounced enhancement in the longitudinal acoustic phonon signal occurs. The results are consistent with similar measurements using GaAs/AlAs SL's, where propagating monochromatic phonons were generated under resonant photoexcitation [Appl. Phys. Lett. 81, 3497 (2002)]

L13 ANSWER 99 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8437790 INSPEC

DOCUMENT NUMBER: A2005-14-7865K-026

TITLE: Dynamic polarization filtering in anisotropically strained M-plane GaN films

AUTHOR: Omae, K.; Flissikowski, T.; Misra, P.; Brandt, O.; Grahn, H.T.; (Paul-Drude-Inst. fur Festkorperelektronik, Berlin, Germany), Kojima, K.; Kawakami, Y.

SOURCE: Applied Physics Letters (9 May 2005), vol.86, no.19, p. 191909-1-3, 10 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(20050509)86:19L:191909:DPFA;1-W

Price: 0003-6951/2005/86(19)/191909-1(3)/\$22.50

Doc.No.: S0003-6951(05)06620-9

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2005:8437790 INSPEC DN A2005-14-7865K-026

AB The dynamic optical polarization filtering for anisotropically strained M-plane **GaN** films on LiAlO₂ is investigated by **pump** and probe spectroscopy. Due to a very large polarization anisotropy in the absorption coefficient, these films exhibit an intrinsic polarization filtering, which appears as a rotation of the polarization vector after transmission of linearly polarized light through the film. For dynamic filtering, the polarization rotation is controlled by the pump, since the photoexcited carriers remove the intrinsic linear dichroism by selective bleaching of the anisotropic absorption. The dynamic behavior of the polarization rotation is mainly determined by the redistribution of holes between the two uppermost valence bands and by the recombination time. The latter is comparable to the measured decay time of the dynamic rotation of about 15 ps. For M-plane GaN films, the maximum dynamic rotation reaches 35°, while the maximum static polarization rotation is about 40°

L13 ANSWER 100 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8407613 INSPEC

DOCUMENT NUMBER: A2005-13-7865K-017

TITLE: Intersubband relaxation dynamics in **GaN**/AlN multiple quantum wells studied by two-color **pump**-probe experiments

AUTHOR: Hamazaki, J.; Kunugita, H.; Ema, K.; (Dept. of Phys., Sophia Univ., Tokyo, Japan), Kikuchi, A.; Kishino, K.

SOURCE: Physical Review B (Condensed Matter and Materials Physics) (15 April 2005), vol.71, no.16, p. 165334-1-5, 24 refs.

CODEN: PRBMDO, ISSN: 0163-1829
SICI: 0163-1829(20050415)71:16L.165334:IRDM;1-9
Price: 0163-1829/2005/71(16)/165334(5)/\$23.00
Doc.No.: S0163-1829(05)07116-x
Published by: APS through AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2005:8407613 INSPEC DN A2005-13-7865K-017

AB We have investigated intersubband relaxation in GaN/AlN multiple quantum wells using a two-color pump-probe technique in a wide energy range around 800 meV (1.55 μm). We have observed not only absorption bleaching signals but also, for the first time, induced absorption signals with an ultrafast and a slow component. Absorption bleaching signals are attributed to a phase space filling of the upper subband and a carrier cooling process in the lower subband, with relaxation times of 140 fs and 300-400 fs, respectively. The ultrafast induced absorption corresponds to the absorption of electrons during intra-subband relaxation and the slow component of 1.3 ps corresponds to the carrier cooling process. We have also found that the intrinsic absorption width of highly doped materials is as large as the inhomogeneous width, because the dispersion difference of subbands is enhanced by exchange interaction

L13 ANSWER 101 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8357168 INSPEC

DOCUMENT NUMBER: A2005-10-4255P-067; B2005-05-4260D-071

TITLE: III-N based short-wavelength LEDs, LUCO-LEDs, and lasers

AUTHOR: Sommer, F.; Stephan, T.; Vollrath, F.; Kohler, K.; Kunzer, M.; Muller, S.; Schlotter, P.; Pletschen, W.; Kaufmann, U.; Wagner, J. (Fraunhofer-Inst. fur Angewandte Festkorperphys., Freiburg, Germany)

SOURCE: Physica Status Solidi A (Sept. 2004), vol.201, no.12, p. 2628-34, 9 refs.

CODEN: PSSABA, ISSN: 0031-8965

SICI: 0031-8965(200409)201:12L.2628:BSWL;1-C

Published by: Wiley-VCH, Germany

Conference: 5th International Symposium on Blue Laser and Light Emitting Diodes (ISBLLED-2004), Gyeongju, South Korea, 15-19 March 2004

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: Practical; Experimental

COUNTRY: Germany

LANGUAGE: English

AN 2005:8357168 INSPEC DN A2005-10-4255P-067; B2005-05-4260D-071

AB Results are presented on the effect of using GaN templates with homogeneously reduced defect density on the performance of violet- and UV-emitting (AlGaIn)N LEDs, as well as on the use of such LED chips as pump light sources in three-phosphor white luminescence conversion LEDs (LUCO-LEDs). For LED chips emitting at 385 nm, an improvement in electroluminescence efficiency by a factor of two was found for growth on 8 \times 10⁷ cm⁻² defect density templates compared to direct growth on sapphire. Further we report on the fabrication and on-wafer testing of violet-emitting ridge waveguide (AlGaIn)N quantum well diode lasers with etched laser facets, grown on sapphire using conventional low-temperature GaN nucleation layer technology as well as on the above low defect density GaN templates. In on-wafer pulsed-mode operation a 35% reduction in threshold current density was achieved for the latter, resulting in a minimum injected power at threshold of 0.9 W for 500 μm \times 2 μm ridge laser diodes with uncoated facets

L13 ANSWER 102 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2005:8319912 INSPEC
 DOCUMENT NUMBER: A2005-08-7865K-030
 TITLE: Measurement of second order susceptibilities of GaN and AlGaN
 AUTHOR: Sanford, N.A.; (Optoelectron. Div., Nat. Inst. of Stand. & Technol., Boulder, CO, USA), Davydov, A.V.; Tsvetkov, D.V.; Dmitriev, A.V.; Keller, S.; Mishra, U.K.; DenBaars, S.P.; Park, S.S.; Han, J.Y.; Molnar, R.J.
 SOURCE: Journal of Applied Physics (1 March 2005), vol.97, no.5, p. 53512-1-13, 27 refs.
 CODEN: JAPIAU, ISSN: 0021-8979
 SICI: 0021-8979(20050301)97:5L:53512:MSOS;1-Q
 Price: 0021-8979/2005/97(5)/053512/3/\$22.50
 Doc.No.: S0021-8979(05)05904-9
 Published by: AIP, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Theoretical; Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 2005:8319912 INSPEC DN A2005-08-7865K-030
 AB Rotational Maker fringes, scaled with respect to $\chi_{11}(2)$ of crystalline quartz, were used to determine the second order susceptibilities $\chi_{31}(2)$ and $\chi_{33}(2)$ for samples of thin Al_xGa_{1-x}N films, a thicker GaN film, and a free-standing GaN platelets. The pump wavelength was 1064 nm. The Al_xGa_{1-x}N samples, ranging in thickness from roughly 0.5 to 4.4 μm , were grown by metalorganic chemical vapor deposition (MOCVD) and hydride vapor-phase epitaxy (HVPE) on (0001) sapphire substrates. The Al mole fractions x were 0, 0.419, 0.507, 0.618, 0.660, and 0.666, for the MOCVD-grown samples, and $x=0$, 0.279, 0.363, and 0.593 for the HVPE-grown samples. An additional HVPE-grown GaN sample 70 μm thick was also examined. The free-standing bulk GaN platelets consisted of an HVPE grown film 226 μm thick removed from its growth substrate, and a crystal 160 μm thick grown by high-pressure techniques. For the Al_xGa_{1-x}N samples, the magnitudes of $\chi_{31}(2)$ and $\chi_{33}(2)$ decrease roughly linearly with increasing x and extrapolate to 0 for $x=1$. Furthermore, the constraint expected for a perfect wurtzite structure, namely $\chi_{33}(2)=-2\chi_{31}(2)$, was seldom observed, and the samples with $x=0.660$ and $x=0.666$ showed $\chi_{31}(2)$ and $\chi_{33}(2)$ having the same sign. These results are consistent with the theoretical studies of nonlinear susceptibilities for AlN and GaN performed by Chen et al. [Appl. Phys. Lett. 66, 1129 (1995)]. The thicker bulk GaN samples displayed a complex superposition of high- and low-frequency Maker fringes due to the multiple-pass interference of the pump and second-harmonic generation beams, and the nonlinear coefficients were approximately consistent with those measured for the thin-film GaN sample

L13 ANSWER 103 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2005:8271017 INSPEC
 DOCUMENT NUMBER: A2005-06-7865K-018
 TITLE: Optical phonon sidebands of electronic intersubband absorption in strongly polar semiconductor heterostructures
 AUTHOR: Wang, Z.; Reimann, K.; Woerner, M.; Elsaesser, T.; (Max-Born-Inst. fur Nichtlineare Opt. und Kurzzeitspektroskopie, Berlin, Germany), Hofstetter, D.; Hwang, J.; Schaff, W.J.; Eastman, L.F.
 SOURCE: Physical Review Letters (28 Jan. 2005), vol.94, no.3, p. 037403/1-4, 32 refs.

CODEN: PRLTAO, ISSN: 0031-9007
SICI: 0031-9007(20050128)94:3L:1:OPSE;1-4
Price: 0031-9007/2005/94(3)/037403(4)/\$22.50
Doc.No.: S0031-9007(05)06406-9
Published by: APS, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2005:8271017 INSPEC DN A2005-06-7865K-018

AB We present the first evidence for a distinct optical phonon progression in the linear and nonlinear intersubband absorption spectra of electrons in a GaN/Al_{0.8}Ga_{0.2}N heterostructure. Femtosecond two-color pump-probe experiments in the midinfrared reveal spectral holes on different vibronic transitions separated by the LO-phonon frequency. These features wash out with a decay time of 80 fs due to spectral diffusion. The remaining nonlinear transmission changes decay with a time constant of 380 fs. All results observed are described by the independent boson model

L13 ANSWER 104 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2004:8194183 INSPEC

DOCUMENT NUMBER: A2005-01-7865K-027

TITLE: Studies of the second-order nonlinear optical susceptibilities of GaN/AlGa_N quantum well

AUTHOR: Jingliang Liu; Yaochen Bai; Guiguang Xiong (Dept. of Phys., Wuhan Univ., China)

SOURCE: Physica E (June 2004), vol.23, no.1-2, p. 70-4, 21 refs.

CODEN: PELNFM, ISSN: 1386-9477

SICI: 1386-9477(200406)23:1/2L:70:SSON;1-W

Price: 1386-9477/2004/\$30.00

Published by: Elsevier, Netherlands

DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
COUNTRY: Netherlands
LANGUAGE: English

AN 2004:8194183 INSPEC DN A2005-01-7865K-027

AB The second-order susceptibilities of GaN/AlGa_N QWs have been studied by taking the strain-induced piezoelectric and spontaneous polarization effects into account, and the second-order susceptibilities as a function of Al content x , well width w , and pump photo energy $\hbar\omega$, have also been analyzed

L13 ANSWER 105 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2004:8144120 INSPEC

DOCUMENT NUMBER: A2004-23-7135-008

TITLE: Subpicosecond exciton spin relaxation in GaN

AUTHOR: Kuroda, T.; Yabushita, T.; Kosuge, T.; Tackeuchi, A.; (Dept. of Appl. Phys., Waseda Univ., Tokyo, Japan), Taniguchi, K.; Chinone, T.; Horio, N.

SOURCE: Applied Physics Letters (11 Oct. 2004), vol.85, no.15, p. 3116-18, 24 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(20041011)85:15L:3116:SESR;1-G

Price: 0003-6951/2004/85(15)/3116(3)/\$22.00

Doc.No.: S0003-6951(04)03441-2

Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2004:8144120 INSPEC DN A2004-23-7135-008
AB The spin-relaxation process of A-band exciton in **GaN** is observed by spin-dependent **pump** and probe reflectance measurement with subpicosecond time resolution. The spin-relaxation times at 150-225 K are 0.47-0.25 ps. These are at least one order of magnitude shorter than those of the other III-V compound semiconductors. The spin-relaxation time τ_s is found to be proportional to $T^{-1.4}$, where T is the temperature

L13 ANSWER 106 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:8038592 INSPEC
DOCUMENT NUMBER: B2004-09-2560S-002
TITLE: Femtosecond intersubband dynamics of electrons in AlGaIn/GaN high-electron-mobility transistors
AUTHOR: Wang, Z.; Reimann, K.; Woerner, M.; Elsaesser, T.; (Max-Born-Inst. fur Nichtlineare Optik und Kurzzeitspektroskopie, Berlin, Germany), Hofstetter, D.; Hwang, J.; Schaff, W.J.; Eastman, L.F.
SOURCE: Quantum Electronics and Laser Science (QELS). Postconference Digest (IEEE Cat No.CH37420-TBR), 2003, p. 2 pp. of 930 pp., 4 refs.
Editor(s): Sawchuk, A.A.
ISBN: 1 55752 749 0
Published by: Optical Soc. of America, Washington, DC, USA
Conference: Quantum Electronics and Laser Science (QELS). Postconference Digest, Baltimore, MD, USA, 1-6 June 2003
Sponsor(s): APS/Division of Laser Sci.; IEEE Lasers and Electro-Optics Soc.; Optical Soc. of America
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 2004:8038592 INSPEC DN B2004-09-2560S-002
AB Ultrafast electron dynamics in the inversion layer of an AlGaIn/**GaN** transistor is studied in **pump**-probe experiments with 50-fs midinfrared pulses, el-e2 intersubband scattering and thermalization occur within 200 fs

L13 ANSWER 107 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:8015637 INSPEC
DOCUMENT NUMBER: A2004-16-4265K-014; B2004-08-4340K-010
TITLE: Feasibility study on simultaneous wavelength conversion in GaIn/AlN intersubband optical amplifiers
AUTHOR: Suzuki, N. (Corp. R&D Center, Toshiba Corp., Kawasaki, Japan)
SOURCE: CLEO/Pacific Rim 2003. The 5th Pacific Rim Conference on Lasers and Electro-Optics (IEEE Cat. No.03TH8671), Vol.1, 2003, p. 13 Vol.1 of 875 pp., 2 refs.
ISBN: 0 7803 7766 4
Price: 0 7803 7766 4/2003/\$17.00
Published by: IEEE, Piscataway, NJ, USA
Conference: CLEO/Pacific Rim 2003. The 5th Pacific Rim Conference on Lasers and Electro-Optics, Taipei, Taiwan, 15-19 Dec. 2003
Sponsor(s): Nat. Sci. Council; Minist. of Educ.; Taipei City Gov.; Graduate Inst. of Electro-Optical Eng., Nat. Taiwan Univ.; Center for Inf. and Electron. Technol., Nat. Taiwan Univ.; Center for Nano Sci. and Technol., Nat. Taiwan Univ.; Southern Taiwan Opto-electron. Center of Excellence, Nat. Sun Yat-Sen

Univ.; Inst. of Electro-Optical Eng., Nat. Chiao Tung Univ.; Inst. of Optical Sci., Nat. Central Univ.; Inst. of Atomic and Molecular Sci., Academia Sinica; Opto-Electron. and Syst. Lab., Ind. Technol. Res. Inst.; Int. Program Center, Ind. Technol. Res. Inst.; AOARD/AFOSR and AFOFE, USA; RiTdisplay Corp.; Hamamatsu Photonics K.K.; Chunghwa Telecom Lab

DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Theoretical
COUNTRY: United States
LANGUAGE: English

AN 2004:8015637 INSPEC DN A2004-16-4265K-014; B2004-08-4340K-010
AB Simultaneous wavelength conversion in GaN/AlN intersubband optical amplifiers has been theoretically investigated. The conversion efficiencies at a pump power of +7--10 dBm were predicted to be -10--7 dB depending on the frequency detuning (0.3-10.9 THz)

L13 ANSWER 108 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:7945516 INSPEC
DOCUMENT NUMBER: A2004-11-6322-004; B2004-06-2520D-011
TITLE: Generation of coherent acoustic phonons in nitride-based semiconductor nanostructures
AUTHOR: Gia-Wei Chern; Chi-Kiang Sun; (Graduate Inst. of Electro-Opt. Eng., Nat. Taiwan Univ., Taipei, Taiwan), Sanders, G.D.; Stanton, C.J.
SOURCE: Ultrafast dynamical processes in semiconductors. (Topics in Applied Physics Vol.92), 2004, p. 339-94 of xi+400 pp., 88 refs.
Editor(s): Tsen, K.T.
ISBN: 3 540 40239 X
Published by: Springer-Verlag, Berlin, Germany

DOCUMENT TYPE: Book; Book Article
TREATMENT CODE: General Review
COUNTRY: Germany
LANGUAGE: English

AN 2004:7945516 INSPEC DN A2004-11-6322-004; B2004-06-2520D-011
AB In this chapter, we review experimental and theoretical aspects of coherent acoustic phonon generation in nitride-based semiconductor nanostructures, with particular application to InGa_N/Ga_N multiquantum wells (MQWs). We first discuss the experimental generation and detection of coherent longitudinal-acoustic (LA) phonon oscillations in InGa_N/Ga_N MQWs using the transmission-type **pump** probe technique. With UV femtosecond pulse excitation, photogenerated carriers screen the piezoelectric field and initiate the displacive coherent phonon oscillations. The spatial wavevector of the periodic carrier distribution determines the phonon-oscillation frequency. The induced acoustic phonon oscillations result in a piezoelectric field modulation that then causes an absorption variation through the Franz-Keldysh effect. Injecting another control pulse can further control the resulting coherent phonon oscillations. Both magnitude and phase manipulation can be achieved by controlling, the intensity and time-delay of the control pulse. After reviewing the experimental results, we then present a microscopic theory of the generation and propagation of coherent LA phonons in wurtzite semiconductor MQWs. Under typical experimental conditions, the propagation of coherent LA phonons is described by a loaded-string equation for the lattice displacement. Where the time- and position-dependent loading term is a function of the photoexcited carrier density. We note that this differs from the situation in which coherent LO-phonon oscillations are generated in bulk systems where the coherent LO phonons obey a forced-oscillator equation as opposed to a loaded-string equation. Both deformation-potential and piezoelectric-coupling mechanisms contribute to the driving force in the

loaded-string equation. We also discuss it macroscopic theory N for the generation and dynamics of coherent acoustic phonons in wurtzite semiconductor nanostructures. This approach is based on macroscopic continuum constitution equations, for piezoelectric wurtzite semiconductors. Starting from Poisson's equation and the dynamic elastic equation, a vector-loaded wave equation is obtained. By projecting the corresponding equation to eigenvectors of the elastic Christoffel equation, the loaded-string equation can also be obtained. The macroscopic approach is then used to study the orientation effects on the generation of coherent acoustic phonons and it is found that large coherent transverse acoustic phonon oscillation can be generated when the growth direction of the nanostructure is along certain directions, e.g., [1010]. This coherent transverse wave may have special applications in THz ultrasonics. Finally a phenomenological theory, for the transient transmission measurement of coherent acoustic phonons, is presented. Calculations, based on the loaded-string equation with the optical-measurement theory agree well with the experiments

L13 ANSWER 109 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2004:7855295 INSPEC
 DOCUMENT NUMBER: A2004-06-7865K-006
 TITLE: Ultrafast intersubband relaxation and nonlinear susceptibility at 1.55 μm in GaN/AlN multiple-quantum wells
 AUTHOR: Hamazaki, J.; Matsui, S.; Kunugita, H.; Ema, K.; (Dept. of Phys., Sophia Univ., Tokyo, Japan), Kanazawa, H.; Tachibana, T.; Kikuchi, A.; Kishino, K.
 SOURCE: Applied Physics Letters (16 Feb. 2004), vol.84, no.7, p. 1102-4, 12 refs.
 CODEN: APPLAB, ISSN: 0003-6951
 SICI: 0003-6951(20040216)84:7L:1102:UJRN;1-1
 Price: 0003-6951/2004/84(7)/1102/3/\$22.00
 Doc.No.: S0003-6951(04)03207-3
 Published by: AIP, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 2004:7855295 INSPEC DN A2004-06-7865K-006
 AB Using a degenerate pump-probe technique on the Brewster configuration at room temperature, we investigate the dynamics of the intersubband transition in GaN/AlN multiple-quantum wells. The relaxation dynamics is found to consist of ultrafast (140 fs) and slower (1.3 ps) components. We estimate the third-order susceptibility for the Brewster configuration to be $5.5 \times 10^{-18} \text{ m}^2/\text{V}^2$, which indicates that its value becomes $2.2 \times 10^{-16} \text{ m}^2/\text{V}^2$ when a light beam is parallel to the well

L13 ANSWER 110 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2003:7672090 INSPEC
 DOCUMENT NUMBER: A2003-16-7855-002
 TITLE: Two-photon absorption and multiphoton-induced photoluminescence of bulk GaN excited below the middle of the band gap
 AUTHOR: Toda, Y.; Matsubara, T.; Morita, R.; Yamashita, M.; (Dept. of Appl. Phys., Hokkaido Univ., Sapporo, Japan), Hoshino, K.; Someya, T.; Arakawa, Y.
 SOURCE: Applied Physics Letters (30 June 2003), vol.82, no.26, p. 4714-16, 16 refs.
 CODEN: APPLAB, ISSN: 0003-6951
 SICI: 0003-6951(20030630)82:26L:4714:PAMI;1-T
 Price: 01/03/6951/2003/82(26)/4714(3)/\$20.00
 Doc.No.: S0003-6951(03)02326-x

Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2003:7672090 INSPEC DN A2003-16-7855-002

AB Optical nonlinearity in the yellow luminescence (YL) band of GaN was investigated using thick bulk samples. Transient pump-probe measurements revealed strong transmission changes due to two-photon absorption (TPA) even at the middle of the YL band. The TPA coefficient evaluated reaches 5 cm/GW at about 1.3 eV, which was as large as the mid-gap resonance. The TPA spectrum clearly showed that the observed large nonlinearity originated from the YL band. On the basis of efficient TPA in the YL band, relaxation processes in the multiphoton-induced photoluminescence excitation spectrum were also investigated

L13 ANSWER 111 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7635010 INSPEC

DOCUMENT NUMBER: A2003-13-7865K-026; B2003-06-2530C-123

TITLE: Recent progress in GaN-based superlattices for near-infrared intersubband transitions

AUTHOR: Ng, H.M.; Gmachl, C.; Herber, J.D.; Hsu, J.W.P.;
(Lucent Technol. Bell Labs., Murray Hill, NJ, USA),
Chu, S.N.G.; Cho, A.Y.

SOURCE: Physica Status Solidi B (Dec. 2002), vol.234, no.3, p.
817-21, 14 refs.

CODEN: PSSBBD, ISSN: 0370-1972

SICI: 0370-1972(200212)234:3L.817:RPBS;1-F

Price: 0370-1972/02/23412-0817\$17.50+.50/0

Published by: Wiley-VCH, Germany

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: Germany

LANGUAGE: English

AN 2003:7635010 INSPEC DN A2003-13-7865K-026; B2003-06-2530C-123

AB A review of the recent progress in intersubband transitions in GaN-based superlattice structures grown by plasma-assisted molecular beam epitaxy (MBE) is presented. Careful control of the growth parameters resulted in reduced threading dislocation density as well as optimized interfaces for the superlattices. Intersubband absorption has been observed from a variety of configurations involving GaN single or asymmetric double quantum wells with either thick Al_xGa_{1-x}N barriers or short-period GaN/Al_xGa_{1-x}N superlattice barriers. The peak wavelength of absorption can be varied between 1.4-4.2 μm by changing the quantum well thickness. Electron scattering times were measured by the pump-probe technique and were found to be 240-330 fs at 1.55 μm. In addition, intersubband transitions have also been observed for GaN/AlN superlattices grown with a non-polar (112-0) orientation

L13 ANSWER 112 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7588040 INSPEC

DOCUMENT NUMBER: A2003-10-7847-005

TITLE: Spectral analysis of high-harmonic coherent acoustic phonons in piezoelectric semiconductor multiple quantum wells

AUTHOR: Gia-Wei Chern; Kung-Hsuan Lin; Yue-Kai Huang;
Chi-Kuang Sun (Graduate Inst. of Electro-Opt. Eng.,
Nat. Taiwan Univ., Taiwan)

SOURCE: Physical Review B (Condensed Matter and Materials
Physics) (15 March 2003), vol.67, no.12, p.
121303-1-4, 24 refs.

CODEN: PRBMDO, ISSN: 0163-1829

SICI: 0163-1829(20030315)67:12L:121303:SAHH;1-T
Price: 0163-1829/2003/67(12)/121303(4)/\$20.00
Published by: APS through AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2003:7588040 INSPEC DN A2003-10-7847-005

AB Multiple harmonic components have been observed in the Fourier spectra of the coherent acoustic phonon oscillations in InGaN/GaN multiple quantum wells (MQW's). The dependence of the relative magnitudes of the first two Fourier components on the sample geometry was analyzed by conducting time-resolved pump-probe measurements on MQW samples with different well-to-barrier ratios. The results were also compared with the recently proposed loaded-string model [Phys. Rev. B 64, 235316 (2001)], and an overall agreement is obtained which validates the picture of string oscillation with inhomogeneous loadings. We also demonstrated manipulation of the spectral components using the coherent optical control technique. Our demonstration can be regarded as a first step to the realization of wave-form synthesis of nanoacoustic waves

L13 ANSWER 113 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7585777 INSPEC

DOCUMENT NUMBER: A2003-10-7865K-032

TITLE: Ultrafast differential transmission spectroscopy of excitonic transitions in InGaN/GaN multiple quantum wells

AUTHOR: Fei Chen; Cheung, M.C.; Sweeney, P.M.; Kirkey, W.D.; Furis, M.; Cartwright, A.N. (Dept. of Electr. Eng., State Univ. of New York, Buffalo, NY, USA)

SOURCE: Journal of Applied Physics (15 April 2003), vol.93, no.8, p. 4933-5, 16 refs.

CODEN: JAPIAU, ISSN: 0021-8979

SICI: 0021-8979(20030415)93:8L:4933:UDTS;1-3

Price: 0021-8979/2003/93(8)/4933(3)/\$19.00

Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2003:7585777 INSPEC DN A2003-10-7865K-032

AB Room-temperature carrier dynamics in InGaN/GaN multiple quantum wells are studied by employing ultrafast pump-probe spectroscopy. Specifically, the observed differential spectral signatures are characteristic of changes in the absorption coefficient through both a reduction of the quantum-confined Stark shift due to the photoinduced in-well field screening (low carrier densities) and excitonic absorption quenching (high carrier densities). The comparison of the differential absorption spectra at different injected carrier densities allows us to separate field screening from excitonic bleaching. The estimated in-well field at the transition point between field screening and excitonic bleaching is consistent with the theoretical value of the piezoelectric field in the strained InGaN well

L13 ANSWER 114 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7562762 INSPEC

DOCUMENT NUMBER: A2003-09-7865K-002; B2003-04-2520D-066

TITLE: Midinfrared pump-probe reflection spectroscopy of the coupled phonon-plasmon mode in GaN

AUTHOR: Nagai, M.; Ohkawa, K.; Kuwata-Gonokami, M. (Dept. of Appl. Phys., Univ. of Tokyo, Japan)

SOURCE: Applied Physics Letters (15 July 2002), vol.81, no.3,

p. 484-6, 13 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20020715)81:3L:484:MPPR;1-9
Price: 01/03/6951/2002/81(3)/484(3)/\$19.00
Doc.No.: S0003-6951(02)05228-2
Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2003:7562762 INSPEC DN A2003-09-7865K-002; B2003-04-2520D-066

AB Strong photoinduced reflectivity change in the midinfrared region in GaN is observed by femtosecond pump-probe measurements. By comparing the results of simultaneous emission and reflectivity measurements, we show that midinfrared reflectivity spectra are governed by coupled phonon-plasmon modes and spatial inhomogeneity of carrier density. Even when the plasma frequency lies in the far infrared region at low carrier density of 10^{18} cm^{-3} , the strong plasmon-phonon coupling drives the position of upper phonon-plasmon mode to midinfrared region, allowing us to investigate dynamics of photogenerated free carriers in GaN-based materials by midinfrared reflectivity measurements

L13 ANSWER 115 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7562675 INSPEC

DOCUMENT NUMBER: A2003-09-4255P-003; B2003-04-4320J-074

TITLE: Fabrication of an InGaN multiple-quantum-well laser diode featuring high reflectivity semiconductor/air distributed Bragg reflectors

AUTHOR: Hailong Wang; Kumagai, M.; Tawara, T.; Nishida, T.; Akasaka, T.; Kobayashi, N.; Saitoh, T. (NTT Basic Res. Labs., NTT Corp., Kanagawa, Japan)

SOURCE: Applied Physics Letters (16 Dec. 2002), vol.81, no.25, p. 4703-5, 13 refs.

CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20021216)81:25L:4703:FIMQ;1-C
Price: 01/03/6951/2002/81(25)/4703(3)/\$19.00
Doc.No.: S0003-6951(02)05150-1
Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2003:7562675 INSPEC DN A2003-09-4255P-003; B2003-04-4320J-074

AB High-quality deeply-etched GaN-based semiconductor/air distributed Bragg reflectors (DBRs) have been fabricated. A 50% reduction relative to the value for reflectors of Fabry-Perot type in the threshold pump intensity was realized by the introduction of such DBRs at the ends of the laser cavity. The reflectivity of the grating was evaluated between 44% and 62%. Finite-difference time-domain simulation had earlier been used to obtain a design for the semiconductor/air DBRs, which provides high values for reflectivity despite a significant inclination from the vertical of the sidewalls of the structure

L13 ANSWER 116 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7556010 INSPEC

DOCUMENT NUMBER: A2003-08-7135-003; B2003-04-2520D-044

TITLE: Excitonic optical Stark effect in GaN

AUTHOR: Choi, C.K.; (Center for Laser & Photonics Res., Oklahoma State Univ., Stillwater, OK, USA), Chang, Y.C.; Lam, J.B.; Shee, S.K.; Krasinski, J.S.; Song, J.J.

SOURCE: Proceedings of the SPIE - The International Society

for Optical Engineering (2002), vol.4643, p. 139-47,
19 refs.

CODEN: PSISDG, ISSN: 0277-786X

SICI: 0277-786X(2002)4643L:139:EOSE;1-4

Price: 0277-786X/02/\$15.00

Published by: SPIE-Int. Soc. Opt. Eng, USA

Conference: Ultrafast Phenomena in Semiconductors VI,
San Jose, CA, USA, 21-25 Jan. 2002

Sponsor(s): SPIE

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: Theoretical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 2003:7556010 INSPEC DN A2003-08-7135-003; B2003-04-2520D-044

AB We report experimental and theoretical studies of the excitonic optical Stark effect in GaN photoexcited below the excitonic resonances with various polarization configurations and pump detunings, using nondegenerate pump-probe spectroscopy at 10 K. We observed that the Stark effect in GaN is strongly dependent on pump and probe relative linear polarizations. We found that this dependence results from the small spin-orbit splitting in GaN and a mixing of A and B valence bands induced by a linearly polarized pump. Using two different circular polarization configurations, we also observed splitting of degenerate excitons because of different optical Stark shifts. Our experimental results are explained by a simple theoretical model

L13 ANSWER 117 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2003:7515970 INSPEC

DOCUMENT NUMBER: A2003-05-4265G-003; B2003-03-4340G-003

TITLE: Bleaching dynamics of resonantly excited excitons in GaN thin films at room temperature

AUTHOR: Gia-Wei Chern; Yin-Chieh Huang; Jian-Chin Liang;
Chi-Kuang Sun; (Graduate Inst. of Electro-Opt. Eng.,
Nat. Taiwan Univ., Taipei, Taiwan), Keller, S.;
DenBaars, S.P.

SOURCE: Technical Digest. Summaries of papers presented at the
Conference on Lasers and Electro-Optics. Conference
Edition (IEEE Cat. No.02CH37337), vol.1, 2002, p.
656-7 vol.1 of (670+96 suppl.) pp., 5 refs.

ISBN: 1 55752 705 9

Published by: Opt. Soc. America, Washington, DC, USA

Conference: Technical Digest. Summaries of papers
presented at the Conference on Lasers and

Electro-Optics. Conference Edition, Long Beach, CA,
USA, 19-24 May 2002

Sponsor(s): IEEE/Lasers & Electro-Opt. Soc.; OSA-Opt.
Soc. America; Quantum Electron. Div. Eur. Phys. Soc.;
Opt. Soc. Japanese Quantum Electron. Joint Group

DOCUMENT TYPE: Conference; Conference Article

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2003:7515970 INSPEC DN A2003-05-4265G-003; B2003-03-4340G-003

AB Summary form only given. Through optical absorption measurement, exciton ionization has been observed in GaN epilayers up to room temperature. By using transmission-type pump probe measurement around the exciton transition energy, we report, to our knowledge, the first direct measurement of exciton ionization process in wurzite GaN

L13 ANSWER 118 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2002:7462728 INSPEC

DOCUMENT NUMBER: A2003-01-7360L-003; B2003-01-2520D-011

TITLE: Ultrashort hole capture time in Mg-doped GaN thin films
AUTHOR: Kung-Hsuan Lin; Gia-Wei Chern; Shi-Wei Chu; Chi-Kuang Sun; (Dept. of Electr. Eng., Nat. Taiwan Univ., Taipei, Taiwan), Huili Xing; Smorchkova, Y.; Keller, S.; Mishra, U.; DenBaars, S.P.
SOURCE: Applied Physics Letters (18 Nov. 2002), vol.81, no.21, p. 3975-7, 20 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20021118)81:21L:3975:UHCT;1-N
Price: 01/03/6951/2002/81(21)/3975(3)/\$19.00
Doc.No.: S0003-6951(02)02246-5
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English
AN 2002:7462728 INSPEC DN A2003-01-7360L-003; B2003-01-2520D-011
AB Hole capture time in p-type GaN was measured by using a femtosecond pump-probe technique. The capture time constant that holes are trapped by Mg-related states was found to be shorter than 10 ps. The hole capture time increases with decreased hole excess energy. By comparing two samples with different doping concentrations, it was found that the hole capture time also decreases with increased doping concentrations

L13 ANSWER 119 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7358936 INSPEC
DOCUMENT NUMBER: A2002-19-7220H-001
TITLE: Hot phonons and non-thermal carrier states in GaN
AUTHOR: Kyhm, K.; Taylor, R.A.; O'Sullivan, E.D.; Ryan, J.F.; (Clarendon Lab., Oxford Univ., UK), Cain, N.J.; Roberts, V.; Roberts, J.S.; Rota, L.
SOURCE: Physica B (11 March 2002), vol.314, no.1-4, p. 30-4, 12 refs.
CODEN: PHYBE3, ISSN: 0921-4526
SICI: 0921-4526(20020311)314:1/4L:30:PTCS;1-1
Price: 0921-4526/02/\$22.00
Doc.No.: S0921-4526(01)01438-7
Published by: Elsevier, Netherlands
Conference: Twelfth International Conference on Nonequilibrium Carrier Dynamics in Semiconductors. HCIS-12, Sante Fe, NM, USA, 27-31 Aug. 2001
Conference; Conference Article; Journal
DOCUMENT TYPE: Theoretical; Experimental
TREATMENT CODE: Theoretical; Experimental
COUNTRY: Netherlands
LANGUAGE: English
AN 2002:7358936 INSPEC DN A2002-19-7220H-001
AB Non-thermal carrier states at early times are studied using femtosecond pump-probe spectroscopy in GaN. After the residual chirp on the continuum probe is removed, the normalized difference spectra (NDS) for different probe energies are synchronized, recovering the full time resolution of our laser pulse (120 fs). Our Monte-Carlo simulation agree well with the unchirped NDS spectrum, which shows the development of the carrier distribution at early times, where phonon satellites are seen, together with a strong non-thermal electron distribution in the region of the LO-phonon energy arising from the remarkably strong electron-LO phonon interaction. Employing a new technique which involves the integration of the normalized NDS multiplied by the corresponding energy, a measure of the mean energy of the carriers in non-thermal states is obtained. By comparing the time-dependent energy loss with the theoretical energy loss rate, we estimate the effective temperature of the phonon modes as well

as the population of phonons. Our Monte Carlo model agrees well with this data, and confirms the dominance of hot phonon effects at early times

L13 ANSWER 120 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7273464 INSPEC
DOCUMENT NUMBER: A2002-13-7820J-001
TITLE: The excitonic optical Stark effect in GaN
AUTHOR: Choi, C.K.; (Center for Laser & Photonics Res.,
Oklahoma State Univ., Stillwater, OK, USA), Yia-Chung
Chang; Lam, J.B.; Gainer, G.H.; Shee, S.K.; Krasinski,
J.S.; Song, J.J.
SOURCE: Physica Status Solidi A (March 2002), vol.190, no.1,
p. 99-105, 16 refs.
CODEN: PSSABA, ISSN: 0031-8965
SICI: 0031-8965(200203)190:1L.99:EOSE;1-X
Price: 0031-8965/02/19003-0099\$ 7.50+.50/0
Published by: Wiley-VCH, Germany
Conference: International Workshop on Physics of
Light-Matter Coupling in Nitrides (PLMCN-1), Rome,
Italy, 26-29 Sept. 2001
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: Germany
LANGUAGE: English

AN 2002:7273464 INSPEC DN A2002-13-7820J-001
AB The dynamic Stark effect of excitons in GaN at 10 K with excitation well
below the excitonic resonances was studied using nondegenerate
femtosecond pump-probe spectroscopy with co- and cross-linear
polarization configurations. In contrast to two-dimensional GaAs/AlGaAs
quantum wells, which have Bloch eigenstates similar to those of GaN and a
large spin-orbit coupling, we observed that the Stark effect in
GaN is strongly dependent on the **pump** and probe
relative linear polarizations. We found that this dependence results from
the small spin-orbit splitting in GaN and a mixing of the A and B valence
bands induced by a linearly polarized pump

L13 ANSWER 121 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7265966 INSPEC
DOCUMENT NUMBER: A2002-12-7135-009
TITLE: Polarization dependence of the excitonic optical Stark
effect in GaN
AUTHOR: Choi, C.K.; Lam, J.B.; Gainer, G.H.; Shee, S.K.;
Krasinski, J.S.; Song, J.J.; (Dept. of Phys.,
Oklahoma State Univ., Stillwater, OK, USA), Yia-Chung
Chang
SOURCE: Physical Review B (Condensed Matter and Materials
Physics) (15 April 2002), vol.65, no.15, p.
155206/1-7, 27 refs.
CODEN: PRBMDO, ISSN: 0163-1829
SICI: 0163-1829(20020415)65:15L.1:PDEO;1-3
Price: 0163-1829/2002/65(15)/155206(7)/\$20.00
Doc.No.: S0163-1829(02)09815-6
Published by: APS through AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 2002:7265966 INSPEC DN A2002-12-7135-009
AB The dynamic Stark effect of excitons in **GaN** was studied using
femtosecond **pump**-probe spectroscopy with various polarization
configurations and pump detunings at 10 K. In contrast to two-dimensional
GaAs/AlGaAs quantum wells which have Bloch eigenstates similar to those

of GaN and a large spin-orbit coupling, we observed that the Stark effect in **GaN** is strongly dependent on **pump** and probe relative linear polarizations. We found that this dependence results from the small spin-orbit splitting in GaN and a mixing of A and B valence bands induced by a linearly polarized pump. Using two different circular polarization configurations, we also observed splitting of degenerate excitons because of different optical Stark shifts. Our experimental results are explained by a simple theoretical model

L13 ANSWER 122 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7230761 INSPEC
DOCUMENT NUMBER: A2002-10-6320D-002
TITLE: Observation of coherent acoustic phonon oscillations in bulk gallium nitride
AUTHOR: Chi-Kuang Sun; Yue- Kai Huang; (Inst. of Electro-Optical Eng., Nat. Taiwan Univ., Taipei, Taiwan), Smorchkova, Y.; Keller, S.; DenBaars, S.P.
SOURCE: Technical Digest. Summaries of papers presented at the Quantum Electronics and Laser Science Conference. Postconference Technical Digest (IEEE Cat. No.01CH37172), 2001, p. 202-3 of 283+26 postdeadline papers pp., 5 refs.
ISBN: 1 55752 663 X
Published by: Opt. Soc. America, Washington, DC, USA
Conference: Technical Digest. Summaries of papers presented at the Quantum Electronics and Laser Science Conference. Conference Edition, Baltimore, MD, USA, 6-11 May 2001
Sponsor(s): APS/Div. Laser Sci.; IEEE Lasers & Electro-Opt. Soc.; OSA-Opt. Soc. America
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2002:7230761 INSPEC DN A2002-10-6320D-002

AB Progress in femtosecond lasers and ultrafast spectroscopy technology has enabled us to generate and directly observe the coherent oscillation of phonon modes. Coherent optical phonon oscillations have been observed in bulk GaAs, bulk Ge, and a number of other bulk materials. For acoustic phonons, it is much harder to selectively excite a specific coherent acoustic phonon mode in bulk materials. Higher frequency coherent acoustic phonon oscillations were recently observed in AlAs/GaAs superlattices, InGaN/GaN multiple-quantum-wells, and PbTe/PbS quantum dots. In this presentation, we report our observation of high frequency coherent acoustic phonon oscillations in a bulk material, a highly strained bulk **GaN** film. The longitudinal interference of an ultraviolet femtosecond **pump** pulse was used to create periodic carrier distribution in the bulk GaN thin film. The periodic carrier distribution screened out the strain-induced piezoelectric field and initiated the coherent acoustic phonon oscillations corresponding to the carrier periods. The decay time of the initiated coherent phonon oscillation is longer than 250 ps. This long decay time and the traveling wave nature of the generated acoustic phonons provide the hope for the realization of the first phonon laser

L13 ANSWER 123 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7213581 INSPEC
DOCUMENT NUMBER: A2002-09-7847-001; B2002-04-2520D-041
TITLE: Theoretical modeling of femtosecond pump-probe spectroscopy in GaN systems
AUTHOR: Chang, Y.C.; (Dept. of Phys. & Mater. Res. Lab., Illinois Univ., Urbana, IL, USA), Choi, C.K.; Song,

SOURCE: J.J.
Proceedings of the SPIE - The International Society
for Optical Engineering (2001), vol.4280, p. 58-69, 11
refs.
CODEN: PSISDG, ISSN: 0277-786X
SICI: 0277-786X(2001)4280L:58:TMFP;1-3
Price: 0277-786X/01/\$15.00
Published by: SPIE-Int. Soc. Opt. Eng, USA
Conference: Ultrafast Phenomena in Semiconductors V,
San Jose, CA, USA, 25-26 Jan. 2001
Sponsor(s): SPIE
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Theoretical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 2002:7213581 INSPEC DN A2002-09-7847-001; B2002-04-2520D-041
AB We present a theoretical simulation of the femtosecond pump-probe
spectroscopy in GaN systems for photoexcitation both far below and far
above the band gap. Semiconductor Bloch equations for carrier
distribution and exciton polarization are solved numerically. The
simulation results are compared with experiment. The experiment for both
cases was performed at 10 K to study the nonequilibrium carrier dynamics
in bulk GaN. For pump below the band gap, prominent
AC Stark effects are observed, and the theoretical simulation gives
lineshapes of the differential absorption spectra in qualitative
agreement with experiment. If the carrier screening and band renormalized
effects are properly scaled, then good quantitative agreement between
theory and experiment can be obtained for various pump intensities and
detuning energies. For pump far above band gap, the theoretical
simulation shows a fast carrier relaxation due to LO phonon emission and
carrier-carrier scattering with scattering time on the order of 10-100
fs, while experimentally, we find that the hot carriers are strongly
confined in a nonthermal distribution and relaxed collectively to the
band edge at a surprisingly slow rate (with relaxation time around 1 ps)

L13 ANSWER 124 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:7107694 INSPEC
DOCUMENT NUMBER: A2002-02-6322-001; B2002-01-2520D-037
TITLE: Generation of coherent acoustic phonons in strained
GaN thin films
AUTHOR: Yue-Kai Huang; Gia-Wei Chern; Chi-Kuang Sun; (Dept.
of Electr. Eng., Nat. Taiwan Univ., Taipei, Taiwan),
Smorchkova, Y.; Keller, S.; Mishra, U.; DenBaars, S.P.
SOURCE: Applied Physics Letters (12 Nov. 2001), vol.79, no.20,
p. 3361-3, 19 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20011112)79:20L:3361:GCAP;1-J
Price: 0003-6951/2001/79(20)/3361(3)/\$18.00
Doc.No.: S0003-6951(01)03746-9
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 2001:7107694 INSPEC DN A2002-02-6322-001; B2002-01-2520D-037
AB Coherent acoustic phonon oscillations were generated and studied in
strained GaN thin films. Inside the bulk GaN film, the
longitudinal interference of an ultraviolet femtosecond pump
pulse created periodic carrier distribution that screened out the
strain-induced piezoelectric field and initiated the coherent
longitudinal acoustic phonon oscillations corresponding to the carrier
periods. The created coherent phonon oscillation modulated the

piezoelectric field thus modified the absorption property of the GaN thin film through Franz-Keldysh effect. This time-dependent absorption modulation was reflected in the transmission variation of the followed probe pulses, resulting a long decay time 300 ps for the initiated coherent phonon oscillations

L13 ANSWER 125 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:7091412 INSPEC
DOCUMENT NUMBER: A2001-24-7820W-005; B2001-12-0520F-120
TITLE: Picosecond photoinduced reflectivity studies of GaN prepared by lateral epitaxial overgrowth
AUTHOR: Wraback, M.; Shen, H.; (US Army Res. Lab., Adelphi, MD, USA), Eiting, C.J.; Carrano, J.C.; Dupuis, R.D.
SOURCE: GaN and Related Alloys - 1999. Symposium (Materials Research Society Symposium Proceedings Vol.595), 2000, p. W11.55.1-6 of xxvii+10002 pp., 11 refs.
Editor(s): Myers, T.H.; Feenstra, R.M.; Shur, M.S.; Amano, H.
ISBN: 1 55899 503 X
Published by: Mater. Res. Soc, Warrendale, PA, USA
Conference: GaN and Related Alloys - 1999. Symposium, Boston, MA, USA, 28 Nov.-3 Dec. 1999
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English
AN 2001:7091412 INSPEC DN A2001-24-7820W-005; B2001-12-0520F-120
AB The pump-probe technique has been used to perform room temperature studies of the photoinduced changes in the reflectivity ΔR associated with exciton and carrier dynamics in GaN prepared by lateral epitaxial overgrowth. For resonant excitation of cold excitons, the ΔR decay possesses a 720 ps component attributed to the free exciton lifetime in this high quality material. For electrons with small excess energy (<50 meV), the strong increase in the ΔR decay rate with decreasing excitation density suggests that screening of the Coulomb interaction may play an important role in the processes of carrier relaxation and exciton formation. The faster decay times at a given carrier density observed for hot (>100 meV) electron relaxation are attributed to electron-hole scattering in conjunction with the screened electron-LO phonon interaction

L13 ANSWER 126 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:7059061 INSPEC
DOCUMENT NUMBER: A2001-22-4280W-008; B2001-11-4130-036
TITLE: Ultrafast all optical modulation based on intersubband transition in semiconductor quantum wells
AUTHOR: Asano, T.; Yoshizawa, S.; Noda, S.; (Dept. of Electron. Sci. & Eng., Kyoto Univ., Japan), Iizuka, N.; Kaneko, K.; Suzuki, N.; Wada, O.
SOURCE: Optical and Quantum Electronics (July-Oct. 2001), vol.33, no.7-10, p. 963-73, 19 refs.
CODEN: OQELDI, ISSN: 0306-8919
SICI: 0306-8919(200107/10)33:7/10L.963:UOMB;1-S
Price: 0306-8919/2001/\$19.50
Published by: Kluwer Academic Publishers, Netherlands
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Netherlands
LANGUAGE: English
AN 2001:7059061 INSPEC DN A2001-22-4280W-008; B2001-11-4130-036
AB Ultrafast modulation of interband-resonant light by intersubband-resonant light in n-doped GaAs/AlGaAs and GaN/AlGa quantum wells was

investigated by femtosecond pump-probe technique. A planar-type AlGaAs/GaAs modulation device shows a modulation speed of 1 ps at room temperature. The observed modulation efficiency indicates that 99% modulation can be achieved with a control pulse energy of 1 pJ when a waveguide-type device structure is utilized. The feasibility of the all-optical modulation in GaN/AlGa quantum wells is also investigated. The intersubband carrier relaxation time, which mainly determines the modulation speed, is measured and is found to be extremely fast (130-170 fs). The results indicate that the optical modulation at a bit rate of over 1 Tb/s will be possible by utilizing the intersubband transition in GaN/AlGa quantum wells. The modulation efficiency in GaN/AlGa quantum wells is also discussed in comparison with that in GaAs/AlGaAs quantum wells

L13 ANSWER 127 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2001:6965585 INSPEC
 DOCUMENT NUMBER: A2001-15-7847-003; B2001-08-2520D-023
 TITLE: Picosecond Z-scan measurements on bulk GaN crystals
 AUTHOR: Pacebutas, V.; Stalnionis, A.; Krotkus, A.;
 (Semicond. Phys. Inst., Vilnius, Lithuania), Suski,
 T.; Perlin, P.; Leszczynski, M.
 SOURCE: Applied Physics Letters (25 June 2001), vol.78, no.26,
 p. 4118-20, 10 refs.
 CODEN: APPLAB, ISSN: 0003-6951
 SICI: 0003-6951(20010625)78:26L:4118:PSMB;1-D
 Price: 0003-6951/2001/78(26)/4118(3)/\$18.00
 Doc.No.: S0003-6951(01)03825-6
 Published by: AIP, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 2001:6965585 INSPEC DN A2001-15-7847-003; B2001-08-2520D-023
 AB Bulk GaN crystals were characterized by using picosecond laser pulses at $\lambda=0.527 \mu\text{m}$ and Z-scan techniques. The role of the free-carrier absorption was evaluated by a dynamical, pump-and-probe-type transmittivity measurement. The values of two-photon absorption coefficient (17-20 cm/GW) and refractive index changes at high optical irradiances due to bound ($n_2=-4+10-12 \text{ esu}$) and free ($\sigma_r=-1.0+10-20 \text{ cm}^3$) electrons in that material were determined

L13 ANSWER 128 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 2001:6928299 INSPEC
 DOCUMENT NUMBER: A2001-12-7865K-026
 TITLE: Ultrafast carrier dynamics in a highly excited GaN epilayer
 AUTHOR: Choi, C.K.; Kwon, Y.H.; Krasinski, J.S.; Park, G.H.;
 Setlur, G.; Song, J.J.; (Dept. of Phys., Oklahoma
 State Univ., Stillwater, OK, USA), Chang, Y.C.
 SOURCE: Physical Review B (Condensed Matter and Materials
 Physics) (15 March 2001), vol.63, no.11, p.
 115315/1-6, 25 refs.
 CODEN: PRBMDO, ISSN: 0163-1829
 SICI: 0163-1829(20010315)63:11L:1:UCDH;1-B
 Price: 0163-1829/2001/63(11)/115315(6)/\$15.00
 Doc.No.: S0163-1829(01)00311-3
 Published by: APS through AIP, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English

AN 2001:6928299 INSPEC DN A2001-12-7865K-026
AB Femtosecond pump-probe transmission spectroscopy was performed at 10 K to study the nonequilibrium carrier dynamics in a GaN thin film for carrier densities ranging from 4×10^{17} to 10^{19} cm⁻³. Spectral hole burning was initially peaked roughly at the excitation energy for an estimated carrier density of 4×10^{18} cm⁻³ and gradually redshifted during the excitation. Because of hot phonon effects, a very slow energy relaxation of the hot carriers at these densities was observed. The hot carriers were strongly confined in a nonthermal distribution and they relaxed collectively to the band edge for 1 ps. We observed remarkable persistence of the excitonic resonances in GaN at carrier densities well above the Mott density at early time delays, indicating that the excitons do not strongly couple to the nonthermal electron-hole plasma

L13 ANSWER 129 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:6895618 INSPEC
DOCUMENT NUMBER: A2001-10-7865K-033; B2001-05-2530C-036
TITLE: Sub-picosecond electron scattering time for $\lambda = 1.55$ μ m intersubband transitions in GaN/AlGaIn multiple quantum wells
AUTHOR: Gmachl, C.; Frolov, S.V.; Ng, H.M.; Chu, S.-N.G.; Cho, A.Y. (Lucent Technol. Bell Labs., Murray Hill, NJ, USA)
SOURCE: Electronics Letters (15 March 2001), vol.37, no.6, p. 378-80, 5 refs.
CODEN: ELLEAK, ISSN: 0013-5194
SICI: 0013-5194(20010315)37:6L:378:PEST;1-8
Price: 0013-5194/2001/\$20.00
Published by: IEE, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United Kingdom
LANGUAGE: English
AN 2001:6895618 INSPEC DN A2001-10-7865K-033; B2001-05-2530C-036
AB GaN-AlGaIn multiple quantum wells with a subband spacing of ~ 740 meV ($\lambda = 1.67$ μ m) have the time resolved pump-and-probe technique, with 1.55 μ m pump and 1.70 μ m probe wavelength. The measurement of an intersubband electron scattering time of 370 fs is reported

L13 ANSWER 130 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:6893543 INSPEC
DOCUMENT NUMBER: A2001-10-7865K-026
TITLE: Thermionic emission dominated carrier dynamics in InGaIn/GaN multiple quantum-wells
AUTHOR: Chi-Kuang Sun; Jian-Chin Liang; Xiang-Yang Yu; (Nat. Taiwan Univ., Taipei, Taiwan), Abare, A.; DenBaars, S.P.
SOURCE: Quantum Electronics and Laser Science Conference (QELS 2000). Technical Digest. Postconference Edition. TOPS Vol.40 (IEEE Cat. No.00CH37089), 2000, p. 257-8 of 318 pp., 5 refs.
ISBN: 1 55752 608 7
Published by: Opt. Soc. America, Salem, MA, USA
Conference: Quantum Electronics and Laser Science Conference (QELS 2000). Technical Digest. Postconference Edition. TOPS Vol.40, San Francisco, CA, USA, 7-12 May 2000
Sponsor(s): APS/Div. Laser Sci.; IEEE/Lasers & Electro-Opt. Soc.; Opt. Soc. America
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: United States

LANGUAGE: English

AN 2001:6893543 INSPEC DN A2001-10-7865K-026

AB Summary form only given. We report on our study of the carrier dynamics in InGaN/GaN MQWs by using femtosecond pump-probe transmission measurements. Our study indicates the existence of a strong barrier field, which is in balance with the strong piezoelectric field within the QWs. After photocarriers have been excited by optical pulses, the thermionically emitted electrons and holes were found to be driven by the barrier field toward different sides of the MQWs, which caused the electron/hole wavefunction separation. The space charge field induced by the separated electrons and holes will screen out part of the barrier field and increase the total electric field in the QWs. Due to the existing barrier field, a weak dependence of the thermionic emission time on the barrier width was observed. Our study suggests that the separated electron/hole wavefunctions might lead to decreased wavefunction overlaps and cause the increased carrier lifetime

L13 ANSWER 131 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2001:6853929 INSPEC

DOCUMENT NUMBER: B2001-04-4260D-021

TITLE: Band-edge luminescence in quaternary AlInGaN light-emitting diodes

AUTHOR: Shatalov, M.; Chitnis, A.; Adivarahan, V.; Lunev, A.; Zhang, J.; Yang, J.W.; Fareed, Q.; Simin, G.; Zakheim, A.; Khan, M.A.; (Dept. of Electr. Eng., South Carolina Univ., Columbia, SC, USA), Gaska, R.; Shur, M.S.

SOURCE: Applied Physics Letters (5 Feb. 2001), vol.78, no.6, p. 817-19, 11 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(20010205)78:6L:817:BELQ;1-R

Price: 0003-6951/2001/78(6)/817(3)/\$18.00

Doc.No.: S0003-6951(01)01005-1

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Practical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 2001:6853929 INSPEC DN B2001-04-4260D-021

AB Operation of InGaN multiple-quantum-well (MQW) light-emitting diodes (LEDs) with quaternary AlInGaN barriers at room and elevated temperatures is reported. The devices outperform conventional GaN/InGaN MQW LEDs, especially at high pump currents. From the measurements of quantum efficiency and total emitted power under dc and pulsed pumping, we show the emission mechanism for quaternary barrier MQWs to be predominantly linked to band-to-band transitions. This is in contrast to localized state emission observed for conventional InGaN/InGaN and GaN/InGaN LEDs. The band-to-band recombination with an increased quantum-well depth improves the high-current performance of the quaternary barrier MQW LEDs, making them attractive for high-power solid-state lighting applications

L13 ANSWER 132 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2001:6812967 INSPEC

DOCUMENT NUMBER: A2001-04-7865K-016; B2001-02-2530C-078

TITLE: Ultrashort (≤ 150 fs) carrier relaxation time of intersubband transition in AlGaIn/GaN multiple quantum wells

AUTHOR: Iizuka, N.; Kaneko, K.; Suzuki, N.; (Corp. Res. & Dev. Centre, Toshiba Corp., Kawasaki, Japan), Asano, T.; Noda, S.; Wada, O.

SOURCE: Conference on Lasers and Electro-Optics (CLEO 2000).

Technical Digest. Postconference Edition. TOPS Vol.39 (IEEE Cat. No.00CH37088), 2000, p. 358-9 of 720 pp., 4 refs.

ISBN: 1 55752 634 6

Published by: Opt. Soc. America, Salem, MA, USA

Conference: Conference on Lasers and Electro-Optics (CLEO 2000). Technical Digest. Postconference Edition. TOPS Vol.39, San Francisco, CA, USA, 7-12 May 2000

Sponsor(s): IEEE/Lasers & Electro-Opt. Soc.; Opt. Soc. America; Quantum Electron. & Opt. Div. Eur. Phys. Soc.;

Japanese Quantum Electron. Joint Group

Conference; Conference Article

DOCUMENT TYPE:

TREATMENT CODE:

COUNTRY:

LANGUAGE:

Experimental

United States

English

AN 2001:6812967 INSPEC DN A2001-04-7865K-016; B2001-02-2530C-078

AB Summary form only given. Intersubband transition (ISBT) in semiconductor multiple quantum wells (MQWs) is a promising phenomenon for realizing, ultrafast optoelectronic devices because of the very short relaxation time. Above all, the relaxation time of the ISBT in AlGaIn-GaN MQWs is theoretically predicted to be 100 fs or shorter, due to strong coupling of electrons with the longitudinal (LO) phonons. In this study, we experimentally demonstrated the ultrafast relaxation process due to ISBT in Al_{0.65}Ga_{0.35}N-GaN MQWs by a **pump-probe** measurement. A theoretical fit indicated that the relaxation time is shorter than 150 fs at a wavelength of 4.6 μ m

L13 ANSWER 133 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2000:6753726 INSPEC

DOCUMENT NUMBER: A2000-24-0765E-004; B2000-12-4260D-033

TITLE: **GaN** light emitting diode as a photoreflectance **pump** source

AUTHOR: Gaskill, D.K.; Holm, R.T.; Glembocki, O.J. (Naval Res. Lab., Washington, DC, USA)

SOURCE: Review of Scientific Instruments (Nov. 2000), vol.71, no.11, p. 4341-3, 8 refs.

CODEN: RSINAK, ISSN: 0034-6748

SICI: 0034-6748(200011)71:11L.4341:LEDP;1-2

Price: 0034-6748/2000/71(11)/4341(3)/\$17.00

Doc.No.: S0034-6748(00)03311-6

Published by: AIP, USA

DOCUMENT TYPE:

Journal

TREATMENT CODE:

Experimental

COUNTRY:

United States

LANGUAGE:

English

AN 2000:6753726 INSPEC DN A2000-24-0765E-004; B2000-12-4260D-033

AB A **GaN** light emitting diode is used as a photoreflectance **pump** source to acquire optical impedance spectroscopy data. Such a pump source has the advantage of having a controllable pump wave form (intensity, modulation depth, and shape) over a broad frequency range. Given the ready availability of light emitting diodes, many different wavelengths are potentially available

L13 ANSWER 134 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2000:6704442 INSPEC

DOCUMENT NUMBER: A2000-20-7360I-009; B2000-10-2530C-090

TITLE: Picosecond carrier transport and capture for InGaIn/GaN single and multiple quantum wells

AUTHOR: Fleischer, S.B.; Keller, S.; Abare, A.C.; Coldren, L.A.; Mishra, U.K.; DenBaars, S.P.; Bowers, J.E. (Dept. of Electr. & Comput. Eng., California Univ., Santa Barbara, CA, USA)

SOURCE: Ultrafast Electronics and Optoelectronics. From
Topical Meeting. OSA Trends in Optics and Photonics
Series Vol.28, 1999, p. 135-8 of x+240 pp., 8 refs.
Editor(s): Bowers, J.E.; Knox, W.H.
ISBN: 1 55752 604 4
Published by: Opt. Soc. America, Washington, DC, USA
Conference: Ultrafast Electronics and Optoelectronics.
From the Topical Meeting, Snowmass, CO, USA, 14-16
April 1999
Sponsor(s): Opt. Soc. America
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2000:6704442 INSPEC DN A2000-20-7360L-009; B2000-10-2530C-090
AB The picosecond dynamics of single and multiple InGaN/GaN quantum wells
are investigated using excitation- and wavelength-dependent pump-probe
measurements. We resonantly probe the well population to compare the
capture and efficiency for different sample structures

L13 ANSWER 135 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6685133 INSPEC
DOCUMENT NUMBER: A2000-19-7865K-027
TITLE: Ultrafast intersubband relaxation (≤ 150 fs) in
AlGaIn/GaN multiple quantum wells
AUTHOR: Iizuka, N.; Kaneko, K.; Suzuki, N.; (Corp. Res. &
Dev. Center, Toshiba Corp., Kawasaki, Japan), Asano,
T.; Noda, S.; Wada, O.
SOURCE: Applied Physics Letters (31 July 2000), vol.77, no.5,
p. 648-50, 24 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20000731)77:5L:648:UIR(;1-B
Price: 0003-6951/2000/77(5)/648(3)/\$17.00
Doc.No.: S0003-6951(00)02531-6
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2000:6685133 INSPEC DN A2000-19-7865K-027
AB The ultrafast intersubband relaxation in GaN quantum wells has been
verified. Al_{0.65}Ga_{0.35}N/GaN multiple quantum wells, with as many as 200
wells, were grown by optimizing the barrier thickness and introducing GaN
intermediate layers. The intersubband absorption is sufficiently strong
for the relaxation time to be measured. A pump-probe measurement is
performed to investigate the relaxation. An ultrashort relaxation time of
less than 150 fs is obtained at a wavelength of 4.5 μ m. The transient
time is shorter than that of InGaAs quantum wells by approximately an
order of magnitude. This result is promising for realizing ultrafast
optical switches

L13 ANSWER 136 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6678472 INSPEC
DOCUMENT NUMBER: A2000-19-7865K-001
TITLE: Hot hole relaxation dynamics in p-GaN
AUTHOR: Hong Ye; (Dept. of Phys. & Astron., Rochester Univ.,
NY, USA), Wicks, G.W.; Fauchet, P.M.
SOURCE: Applied Physics Letters (21 Aug. 2000), vol.77, no.8,
p. 1185-7, 23 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20000821)77:8L:1185:HRD;1-O
Price: 0003-6951/2000/77(8)/1185(3)/\$17.00

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2000:6678472 INSPEC DN A2000-19-7865K-001

AB The hot hole relaxation dynamics is studied in a Mg-doped p-type GaN film grown by molecular-beam epitaxy on sapphire. A nondegenerate femtosecond pump-probe technique is used, in which the holes are excited by an infrared pump and the hole dynamics is monitored by a tunable near ultraviolet probe. Complex transients, showing bleaching or induced absorption, are observed. A hot hole energy relaxation time of 0.6 ps has been obtained. Modeling suggests that longitudinal optical phonon emission modified by hot phonon effects is the dominant energy relaxation process

L13 ANSWER 137 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2000:6610401 INSPEC

DOCUMENT NUMBER: A2000-14-7360L-007; B2000-07-2520D-022

TITLE: Femtosecond spectroscopy in GaN with tunable UV pulses

AUTHOR: Ye, H.; (Dept. of Phys. & Astron., Rochester Univ., NY, USA), Wicks, G.W.; Fauchet, P.M.

SOURCE: Proceedings of the SPIE - The International Society for Optical Engineering (1999), vol.3624, p. 188-97, 21 refs.

CODEN: PSISDG, ISSN: 0277-786X

SICI: 0277-786X(1999)3624L:188:FSWT;1-V

Price: 0277-786X/99/\$10.00

Published by: SPIE-Int. Soc. Opt. Eng, USA

Conference: Ultrafast Phenomena in Semiconductors III, San Jose, CA, USA, 27-29 Jan. 1999

Sponsor(s): SPIE

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2000:6610401 INSPEC DN A2000-14-7360L-007; B2000-07-2520D-022

AB The hot electron relaxation dynamics is studied in n-type GaN films grown on sapphire by molecular beam epitaxy. A novel femtosecond pump-probe technique is used in which the electrons are excited by an infrared pump and the carrier dynamics are monitored by a tunable near UV probe. Complex transients, showing bleaching and induced absorption, are observed. The data are fitted by a model in which the LO-phonon emission is the dominant energy relaxation process. The LO-phonon emission time is measured to be 0.2 ps. Above-bandgap pump-probe experiments, in which the electrons are excited by a near ultraviolet (UV) pump from the valence band and probed by a tunable near UV pulse are also performed. They show that the carrier dynamics vary with the probe wavelengths

L13 ANSWER 138 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2000:6610400 INSPEC

DOCUMENT NUMBER: A2000-14-7360L-006; B2000-07-2520D-021

TITLE: Ultrafast carrier dynamics in GaN epilayers studied by femtosecond pump-probe spectroscopy

AUTHOR: Fischer, A.J.; Little, B.D.; Schmidt, T.J.; Choi, C.K.; Song, J.J.; (Center for Laser & Photonics Res., Oklahoma State Univ., Stillwater, OK, USA), Horning, R.; Goldenberg, B.

SOURCE: Proceedings of the SPIE - The International Society for Optical Engineering (1999), vol.3624, p. 179-87,

13 refs.

CODEN: PSISDG, ISSN: 0277-786X

SICI: 0277-786X(1999)3624L:179:UCDE;1-Z

Price: 0277-786X/99/\$10.00

Published by: SPIE-Int. Soc. Opt. Eng, USA

Conference: Ultrafast Phenomena in Semiconductors III,
San Jose, CA, USA, 27-29 Jan. 1999

Sponsor(s): SPIE

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2000:6610400 INSPEC DN A2000-14-7360L-006; B2000-07-2520D-021

AB Femtosecond pump-probe measurements were performed in GaN epilayers to study carrier dynamics in the band edge region. Excitonic absorption was found to begin saturating at a pump fluence of 20 $\mu\text{J}/\text{cm}^2$ which corresponds to an estimated carrier density of $1 \times 10^{18} \text{ cm}^{-3}$. At zero delay between pump and probe, induced absorption is observed below the unpumped band gap due to ultrafast bandgap renormalization. After 375 fs, a large induced transparency is observed just below the excitonic resonance which is due to a transient electron-hole plasma. After 1 ps, the absorption has partially recovered to a level associated with excitonic phase-space filling. The absorption then recovers with a characteristic time of 20 ps, a value which increases with increasing excitation density

L13 ANSWER 139 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2000:6567560 INSPEC

DOCUMENT NUMBER: A2000-11-7855-002

TITLE: Selective enhancement of 1540 nm Er^{3+} emission centers in Er-implanted GaN by Mg codoping

AUTHOR: Kim, S.; (Dept. of Electr. Eng., Korea Univ., Seoul, South Korea), Rhee, S.J.; Li, X.; Coleman, J.J.; Bishop, S.G.

SOURCE: Applied Physics Letters (24 April 2000), vol.76, no.17, p. 2403-5, 24 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(20000424)76:17L:2403:SE1E;1-P

Price: 0003-6951/2000/76(17)/2403(3)/\$17.00

Doc.No.: S0003-6951(00)04917-2

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 2000:6567560 INSPEC DN A2000-11-7855-002

AB The 1540 nm $4\text{I}_{13/2}$ to $4\text{I}_{15/2}$ Er^{3+} photoluminescence (PL) and photoluminescence excitation (PLE) spectra of Er-implanted Mg-doped GaN reveal a selective enhancement of one of the nine different Er^{3+} centers observed previously in PL and PLE studies of Er-implanted undoped GaN. These Er^{3+} PL spectra are excited selectively by pump wavelengths that correspond to broadband, below-gap absorption bands associated with different Er^{3+} centers. In the Er-implanted, Mg-doped GaN, both the 1540 nm PL spectrum characteristic of the so-called violet-pumped Er^{3+} center and the 2.8-3.4 eV (violet) PLE band that enables its selective excitation are significantly enhanced by Mg doping. In addition, the violet-pumped PL center dominates the above-gap-excited Er^{3+} PL spectrum of Er-implanted Mg-doped GaN, whereas it was nearly unobservable under above-gap excitation in Er-implanted undoped GaN. These results confirm our hypothesis that appropriate codopants can increase the efficiency of trap-mediated above-gap excitation of Er^{3+} emission in Er-implanted GaN

L13 ANSWER 140 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6566341 INSPEC
DOCUMENT NUMBER: A2000-10-7855-052
TITLE: Mechanisms of optical gain in cubic GaN and InGaN
AUTHOR: Holst, J.; Hoffmann, A.; Broser, I.; (Tech. Univ. Berlin, Germany), Frey, T.; Schottker, B.; As, D.J.; Schikora, D.; Lischka, K.
SOURCE: GaN and Related Alloys. Symposium, 1999, p. G2.3/6 pp. of 1028 pp., 11 refs.
Editor(s): Pearton, S.J.; Kuo, C.; Wright, A.F.; Uenoyama, T.
ISBN: 1 55899 443 2
Published by: Mater. Res. Soc, Warrendale, PA, USA
Conference: GaN and Related Alloys. Symposium, Boston, MA, USA, 30 Nov.-4 Dec. 1998
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 2000:6566341 INSPEC DN A2000-10-7855-052
AB The epitaxial growth of zinc-blende (cubic) GaN and InGaN on GaAs with a common cleavage plane and readily high-quality, low-cost wafers may be considered as an alternative approach for the future realization of cleaved laser cavities. To obtain detailed information about the potential of cubic GaN and InGaN for device applications we performed optical gain spectroscopy accompanied by time-integrated and time-dependent photoluminescence measurements at 2 K and 300 K. From intensity-dependent gain measurements, the identification of the gain processes was possible. For moderate excitation levels, the biexciton decay is likely to be responsible for a gain structure at 3.265 eV in cubic GaN. For the highest pump intensities, the electron-hole-plasma is the dominant gain process, providing gain values up to 200 cm⁻¹. Furthermore cubic GaN samples with different cavity lengths from 250 to 600 μm were cleaved to investigate the influence of the sample geometry on the gain mechanisms

L13 ANSWER 141 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6504696 INSPEC
DOCUMENT NUMBER: A2000-06-4255P-066; B2000-03-4320J-123
TITLE: Nonlinear optical spectroscopy of highly excited InGaN-GaN multiple quantum well blue laser structures
AUTHOR: Schmidt, T.J.; Bidayk, S.; Cho, Y.H.; Gainer, G.H.; Song, J.-J. (Dept. of Phys., Oklahoma State Univ., Stillwater, OK, USA)
SOURCE: Technical Digest. Summaries of papers presented at the Conference on Lasers and Electro-Optics. Postconference Edition. CLEO '99. Conference on Lasers and Electro-Optics (IEEE Cat. No.99CH37013), 1999, p. 202-3 of 578 pp., 4 refs.
ISBN: 1 55752 595 1
Published by: Opt. Soc. America, Washington, DC, USA
Conference: Technical Digest. Summaries of papers presented at the Conference on Lasers and Electro-Optics. Postconference Edition. CLEO '99. Conference on Lasers and Electro-Optics, Baltimore, MD, USA, 23-28 May 1999
Sponsor(s): IEEE/Lasers & Electro-Opt. Soc.; OSA-Opt. Soc. America; Quantum Electron. Div. Eur. Phys. & Opt. Soc.; Japanese Quantum Electron. Joint Group
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 2000:6504696 INSPEC DN A2000-06-4255P-066; B2000-03-4320J-123

AB Summary form only given. The nonlinear optical properties of highly excited InGa_N/Ga_N multiple quantum well (MQW) blue laser structures have been studied using nondegenerate optical pump-probe spectroscopy, energy selective optically pumped stimulated emission (SE) spectroscopy, and variable stripe gain spectroscopy. The evolution of the near band edge transitions of the InGa_N active layers were monitored using nondegenerate optical pump-probe transmission spectroscopy as the number of photoexcited free carriers was increased beyond that necessary to achieve population inversion. Clear bleaching of band tail states was observed with increasing optical excitation

L13 ANSWER 142 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2000:6481278 INSPEC

DOCUMENT NUMBER: A2000-05-7865K-012

TITLE: Optical nonlinearities in the band edge region of highly excited (In)Ga_N thin films studied via femtosecond and nanosecond optical pump-probe spectroscopy

AUTHOR: Schmidt, T.J.; Fischer, A.J.; Song, J.J. (Center for Laser Res., Oklahoma State Univ., Stillwater, OK, USA)

SOURCE: Physica Status Solidi B (1 Nov. 1999), vol.216, no.1, p. 505-9, 15 refs.

CODEN: PSSBBD, ISSN: 0370-1972

SICI: 0370-1972(19991101)216:1L.505:ONBE;1-M

Price: 0370-1972/99/\$17.50+0.50

Published by: Akademie Verlag, Germany

Conference: 3rd International Conference on Nitride Semiconductors, Montpellier, France, 4-9 July 1999

DOCUMENT TYPE: Conference; Conference Article; Journal

TREATMENT CODE: Experimental

COUNTRY: Germany

LANGUAGE: English

AN 2000:6481278 INSPEC DN A2000-05-7865K-012

AB We present the results of a detailed study of the band edge absorption changes in Ga_N and InGa_N thin films induced by the presence of excess photo-generated free carriers. The 1s A and B free excitonic resonances in Ga_N are shown to decrease with increasing above-gap nanosecond optical excitation due to screening by free carriers and exciton-exciton scattering. The decrease in excitonic absorption with increasing above-gap excitation is accompanied by a significant increase in the below-gap absorption coefficient. To further explore this behavior, femtosecond nondegenerate optical pump-probe experiments were also performed using an amplified Ti:sapphire laser. Exciton saturation due to screening by free carriers and excitonic phase space filling was again observed, along with a modest amount of below-gap induced absorption attributed to band gap renormalization. Similar experiments were performed on InGa_N thin films. The band edge absorption changes observed in InGa_N films were found to be significantly different than those observed in Ga_N

L13 ANSWER 143 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2000:6476695 INSPEC

DOCUMENT NUMBER: A2000-05-4265K-005; B2000-03-4340K-004

TITLE: Piezoelectric field-enhanced second-order nonlinear optical susceptibilities in wurtzite Ga_N/AlGa_N quantum wells

AUTHOR: Ansheng Liu; Chuang, S.-L.; Ning, C.Z. (NASA Ames Res. Center, Moffett Field, CA, USA)

SOURCE: Applied Physics Letters (17 Jan. 2000), vol.76, no.3,

p. 333-5, 15 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(20000117)76:3L:333:PFES;1-W
Price: 0003-6951/2000/76(3)/333(3)/\$15.00
Doc.No.: S0003-6951(90)01203-7
Published by: AIP, USA

DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
COUNTRY: United States
LANGUAGE: English

AN 2000:6476695 INSPEC DN A2000-05-4265K-005; B2000-03-4340K-004

AB Second-order nonlinear optical processes including second-harmonic generation, optical rectification, and difference-frequency generation associated with intersubband transitions in wurtzite GaN/AlGaIn quantum well (QW) are investigated theoretically. Taking into account the strain-induced piezoelectric (PZ) effects, we solve the electronic structure of the QW from coupled effective-mass Schroedinger equation and Poisson equation including the exchange-correlation effect under the local-density approximation. We show that the large PZ field in the QW breaks the symmetry of the confinement potential profile and leads to large second-order susceptibilities. We also show that the interband optical pump-induced electron-hole plasma results in an enhancement in the maximum value of the nonlinear coefficients and a redshift of the peak position in the nonlinear optical spectrum. By use of the difference-frequency generation, THz radiation can be generated from a GaN/Al_{0.75}Ga_{0.25}N with a pump laser of 1.55 μ m

L13 ANSWER 144 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1999:6415835 INSPEC

DOCUMENT NUMBER: B2000-01-4260D-010

TITLE: Infrared LEDs based on Er doping of III-V nitride semiconductors

AUTHOR: Zavada, J.M.; (US Army Res. Office, Research Triangle Park, NC, USA), Thaik, M.; Hommerich, U.; MacKenzie, J.D.; Abernathy, C.R.

SOURCE: Proceedings of the Symposium on Light Emitting Devices for Optoelectronic Applications and Twenty-Eighth State-of-the-Art Program on Compound Semiconductors, 1998, p. 10-18 of xi+642 pp., 24 refs.

Editor(s): Hou, H.Q.; Sah, R.E.; Pearton, S.J.; Ren, F.; Wada, K.

ISBN: 1 56677 194 3

Published by: Electrochem. Soc, Pennington, NJ, USA
Conference: Proceedings of the Symposium on Light Emitting Devices for Optoelectronic Applications and Twenty-Eighth State-of-the-Art Program on Compound Semiconductors, San Diego, CA, USA, 3-8 May 1998

DOCUMENT TYPE: Conference; Conference Article

TREATMENT CODE: Practical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 1999:6415835 INSPEC DN B2000-01-4260D-010

AB III-V nitride semiconductor materials are the focus of intense world-wide research due to the recent development of blue-green light emitting diodes (LEDs) and blue laser diodes (LDs). The impact of these components on optical display systems, optical storage, and white lighting methods appears to be huge. Another area in which the III-V nitrides may be important is in the development of infrared (IR) LEDs and optical amplifiers. Wide gap semiconductors, such as the III-V nitrides, doped with rare earth atoms, offer the prospect of very stable, temperature-insensitive LEDs and optical amplifiers operating at the primary wavelengths, 1.54 μ m and 1.3 μ m, used for optical

communications. A new class of optical amplifiers and optical interconnects, based on rare earth-doped III-V nitride semiconductor materials, may lead to major improvements in various optoelectronic systems. In this paper, we present results concerning a novel IR LED involving Er-doping of III-V nitride semiconductors. The LED is a hybrid device consisting of an Er-doped III-V nitride (GaN) film that is optically pumped by a green InGaN LED. Aspects of Er incorporation in the III-V nitride host, photoluminescence properties, and prototype device structures operating at 1.54 μm are described

L13 ANSWER 145 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1999:6295579 INSPEC
DOCUMENT NUMBER: A1999-16-4255P-020; B1999-08-4320J-116
TITLE: Stimulated emission and lasing in whispering-gallery modes of GaN microdisk cavities
AUTHOR: Seongsik Chang; Rex, N.B.; Chang, R.K.; (Dept. of Appl. Phys., Yale Univ., New Haven, CT, USA), Chong, G.; Guido, L.J.
SOURCE: Applied Physics Letters (12 July 1999), vol.75, no.2, p. 166-8, 20 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(19990712)75:2L:166:SELW;1-4
Price: 0003-6951/99/75(2)/166(3)/\$15.00
Doc.No.: S0003-6951(99)04028-0
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English

AN 1999:6295579 INSPEC DN A1999-16-4255P-020; B1999-08-4320J-116
AB We report optically pumped, pulsed lasing action in whispering-gallery modes of GaN microdisk cavities at room temperature. The microdisk structure was fabricated by reactive-ion etching a 2- μm -thick GaN epitaxial layer grown via metalorganic chemical vapor deposition. Below the lasing threshold, stimulated emission with superlinear pump-intensity dependence is observed. Spontaneous-to-stimulated emission transition occurs at a pump intensity that is 10+ lower than that for a GaN sample without a cavity structure. Above the lasing threshold, the pump-intensity dependence is almost linear and gain pinning is observed. In addition, whispering-gallery modes are observed with the linewidth of individual peaks being as narrow as 0.1 nm

L13 ANSWER 146 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1999:6274748 INSPEC
DOCUMENT NUMBER: A1999-14-7220J-001
TITLE: Ultrafast electron dynamics study of GaN
AUTHOR: Sun, C.-K.; Huang, Y.L.; (Graduate Inst. of Electro-Opt. Eng., Nat. Taiwan Univ., Taipei, Taiwan), Keller, S.; Mishra, U.K.; DenBaars, S.P.
SOURCE: Physical Review B (Condensed Matter) (1 June 1999), vol.59, no.21, p. 13535-8, 18 refs.
CODEN: PRBMDO, ISSN: 0163-1829
SICI: 0163-1829(19990601)59:21L:13535:UEDS;1-G
Price: 0163-1829/99/59(21)/13535(4)/\$15.00
Doc.No.: S0163-1829(99)05221-2
Published by: APS through AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 1999:6274748 INSPEC DN A1999-14-7220J-001
AB Ultrafast electron dynamics in n-doped GaN was investigated

using multiple-wavelength **pump**-probe techniques. A fast electron cooling with a time constant of 500 fs was observed, indicating the electron as the dominant carrier type in cooling processes. Electrons in band-tail states were found to relax at the same rate as conduction electrons, indicating fast (<500 fs) carrier capture into shallow band-tail states and fast scattering between shallow band-tail electrons and conduction band electrons. Our results agree well with the band-tailing model of Chakraborty and Biswas. Impurity screening potential was thus obtained. With a variation of pump photon energy, conduction band intervalley scattering of GaN **was** also studied. With a proper selection of pump **wavelength**, the electron cooling behavior was found to be delayed by intervalley returned electrons with a time constant on the order of 1 ps. By examining the fraction of the delayed cooling component, our data suggested an intervalley scattering threshold energy of 1.34 eV, which is the separation energy between the bottom of the U valley and Γ valley conduction band minimum in wurzite GaN

L13 ANSWER 147 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 1999:6254380 INSPEC
 DOCUMENT NUMBER: A1999-13-7845-003
 TITLE: Mechanisms of optical gain in cubic GaN and InGaN
 AUTHOR: Holst, J.; Hoffmann, A.; Broser, I.; (Tech. Univ. Berlin, Germany), Frey, T.; Schottker, B.; As, D.J.; Schikora, D.; Lischka, K.
 SOURCE: MRS Internet Journal of Nitride Semiconductor Research (1999), vol.4S1, 18 refs.
 CODEN: MIJNF7, ISSN: 1092-5783
 URL: <http://nsr.mij.mrs.org/4S1/G2.3/>
 Collection URL: <http://nsr.mij.mrs.org/>
 Published by: Mater. Res. Soc, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 1999:6254380 INSPEC DN A1999-13-7845-003
 AB The epitaxial growth of zinc-blende (cubic) GaN and InGaN on GaAs with a common cleavage plane and readily high-quality, low-cost wafers may be considered as an alternative approach for the future realization of cleaved laser cavities. To obtain detailed information about the potential of cubic GaN and InGaN for device applications we performed optical gain spectroscopy accompanied by time-integrated and time-dependent photoluminescence measurements at 2 K and 300 K. From intensity-dependent gain measurements, the identification of the gain processes was possible. For moderate excitation levels, the biexciton decay is likely to be responsible for a gain structure at 3.265 eV in cubic **GaN**. For the highest **pump** intensities, the electron-hole-plasma is the dominant gain process, providing gain values up to 200 cm⁻¹. Furthermore, cubic GaN samples with different cavity lengths from 250 to 600 μ m were cleaved to investigate the influence of the sample geometry on the gain mechanisms. In these samples increased gain values up to 150 cm⁻¹ as well as lower threshold excitation densities were observed, indicating the potential of cubic GaN for device applications. The results of GaN will be compared with intensity-dependent gain measurements on InGaN samples, grown on GaAs with varying In-content. The observed gain mechanisms in cubic InGaN will be discussed in detail

L13 ANSWER 148 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 1999:6225584 INSPEC
 DOCUMENT NUMBER: A1999-10-4265-009; B1999-05-4340-017
 TITLE: Large optical nonlinearities near the bandgap of

AUTHOR: MOCVD-grown GaN thin films
 Schmidt, T.J.; Song, J.J.; (Center for Laser &
 Photonics Res., Oklahoma State Univ., Stillwater, OK,
 USA), Chang, Y.C.; Horning, R.; Goldenberg, B.
 SOURCE: Technical Digest. Summaries of Papers Presented at the
 International Quantum Electronics Conference.
 Conference Edition. 1998 Technical Digest Series,
 Vol.7 (IEEE Cat. No.98CH36236), 1998, p. 240-1 of 256
 pp., 5 refs.
 ISBN: 1 55752 541 2
 Price: 1 55752 521 8/98/\$15.00
 Published by: Opt. Soc. America, Washington, DC, USA
 Conference: Technical Digest Summaries of papers
 presented at the International Quantum Electronics
 Conference Conference Edition. 1998 Technical Digest
 Series, Vol.7, San Francisco, CA, USA, 3-8 May 1998
 Sponsor(s): APS/Div. Lasers Sci.; IEEE/Lasers &
 Electro-Opt. Soc.; OSA- Opt. Soc. America; US Joint
 Council on Quantum Electron.; Int. Council on Quantum
 Electron.; Int. Commission for Opt.; IUPAP
 DOCUMENT TYPE: Conference; Conference Article
 TREATMENT CODE: New Development; Practical; Experimental
 COUNTRY: United States
 LANGUAGE: English

AN 1999:6225584 INSPEC DN A1999-10-4265-009; B1999-05-4340-017
 AB To study the effects of high densities of excess free carriers on the
 optical transitions near the band edge of wurtzite GaN,
 nondegenerate nanosecond optical pump-probe transmission and
 reflection experiments have been performed on GaN thin films grown by
 metallo-organic chemical-vapor deposition (MOCVD) on (0001)-oriented
 sapphire. The large magnitude of the optical nonlinearities observed in
 our work suggests the possibility of new optoelectronic applications

L13 ANSWER 149 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 1999:6148161 INSPEC
 DOCUMENT NUMBER: A1999-05-7865K-020
 TITLE: Hot electron relaxation time in GaN
 AUTHOR: Hong Ye; (Dept. of Phys. & Astron., Rochester Univ.,
 NY, USA), Wicks, G.W.; Fauchet, P.M.
 SOURCE: Applied Physics Letters (1 Feb. 1999), vol.74, no.5,
 p. 711-13, 17 refs.
 CODEN: APPLAB, ISSN: 0003-6951
 SICI: 0003-6951(19990201)74:5L:711:ERT;1-U
 Price: 0003-6951/99/74(5)/711(3)/\$15.00
 Doc.No.: S0003-6951(99)01005-0
 Published by: AIP, USA
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English

AN 1999:6148161 INSPEC DN A1999-05-7865K-020
 AB The hot electron relaxation time is studied in an n-type GaN film grown
 by molecular beam epitaxy on sapphire. A femtosecond pump-probe technique
 is used in which the electrons are excited by an infrared pump and the
 carrier dynamics are monitored by a tunable near ultraviolet probe.
 Complex transients, showing bleaching or induced absorption, are
 observed. The data are fitted by a model in which the longitudinal
 optical (LO)-phonon emission is the dominant energy relaxation process.
 The LO-phonon emission time is measured to be 0.2 ps

L13 ANSWER 150 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 1998:5871381 INSPEC

DOCUMENT NUMBER: A1998-09-7865-036
TITLE: Large optical nonlinearities near the band gap of GaN thin films
AUTHOR: Schmidt, T.J.; Song, J.J.; (Dept. of Phys., Oklahoma State Univ., Stillwater, OK, USA), Chang, Y.C.; Horning, R.; Goldenberg, B.
SOURCE: Applied Physics Letters (23 March 1998), vol.72, no.12, p. 1504-6, 12 refs.
CODEN: APPLAB, ISSN: 0003-6951
SICI: 0003-6951(19980323)72:12L:1504:LONN;1-X
Price: 0003-6951/98/72(12)/1504(3)/\$15.00
Doc.No.: S0003-6951(98)03712-7
Published by: AIP, USA
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 1998:5871381 INSPEC DN A1998-09-7865-036

AB The interband optical transitions in single-crystal GaN films grown by metal organic chemical vapor deposition have been studied at 10 K and room temperature using nondegenerate nanosecond optical pump-probe techniques. At low temperatures, strong, well-resolved features are seen in the absorption and reflection spectra corresponding to the 1s A and B exciton transitions. These features broaden and decrease in intensity due to the presence of a high density of photoexcited free carriers and are completely absent in the absorption and reflection spectra as the excitation density, I_{exc} , approaches 3 MW/cm², resulting in induced transparency in transmission measurements. The absorption spectra also show induced absorption below the band gap as I_{exc} is increased. Both the observed induced transparency and induced absorption were found to be extremely large, exceeding 4×10^4 cm⁻¹ as the pump density approaches 3 MW/cm² at 10 K

L13 ANSWER 151 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1997:5698863 INSPEC

DOCUMENT NUMBER: B1997-11-4260D-004

TITLE: The process and efficiency of ultraviolet generation from gallium nitride blue light emitting diodes

AUTHOR: Basrur, J.P.; Choa, F.S.; (Dept. of Comput. Sci. & Electr. Eng., Maryland Univ., Baltimore, MD, USA), Liu, P.-L.; Sipior, J.; Rao, G.; Carter, G.M.; Chen, Y.J.

SOURCE: Applied Physics Letters (8 Sept. 1997), vol.71, no.10, p. 1385-7, 7 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(19970908)71:10L:1385:PEUG;1-S

Price: 0003-6951/97/71(10)/1385/3/\$10.00

Doc.No.: S0003-6951(97)04736-0

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Practical; Theoretical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 1997:5698863 INSPEC DN B1997-11-4260D-004

AB To obtain small size, high speed ultraviolet sources, we studied the ultraviolet (UV) generation process and efficiency of gallium nitride (GaN) blue light emitting diodes (LEDs). The blue and UV emissions follow a four-level recombination model. Depending on the pump pulse amplitude, the UV-to-blue generation ratio increases and then saturates with increasing pump pulse duration. High efficiency, up to 450 μ W UV power at 380 nm, can be obtained from a 1.2 mW blue LED

L13 ANSWER 152 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 1997:5595598 INSPEC
 DOCUMENT NUMBER: B1997-07-4260D-012
 TITLE: Time resolved spectra study of GaN light emitting diodes (LEDs)
 AUTHOR: Choa, F.S.; Fan, J.Y.; Liu, P.-L.; Sipior, J.; Rao, G.; Carter, G.M.; Chen, Y.J. (Dept. of Comput. Sci., Maryland Univ., Baltimore, MD, USA)
 SOURCE: Conference Proceedings. LEOS '96 9th Annual Meeting. IEEE Lasers and Electro-Optics Society 1996 Annual Meeting (Cat. No.96CH35895), vol.1, 1996, p. 278-9 vol.1 of 2 vol. (xviii+400+xx+438) pp., 4 refs. ISBN: 0 7803 3160 5
 Published by: IEEE, New York, NY, USA
 Conference: Conference Proceedings LEOS'96 9th Annual Meeting IEEE Lasers and Electro-Optics Society, Boston, MA, USA, 18-19 Nov. 1996
 DOCUMENT TYPE: Conference; Conference Article
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English
 AN 1997:5595598 INSPEC DN B1997-07-4260D-012
 AB We study time-resolved-spectra of InGaN and GaN diodes with a short electrical pulse. LEDs with four different structures were studied: the bulk InGaN/GaN blue LED ($\lambda_{\text{peak}} = 450 \text{ nm}$); the InGaN single quantum well (SQW) blue LED ($\lambda_{\text{peak}} = 470 \text{ nm}$); the InGaN SQW green LED ($\lambda_{\text{peak}} = 525 \text{ nm}$); and the Zn disordered GaN active layer ($\lambda_{\text{peak}} = 430 \text{ nm}$). When pumped with short electrical pulses, some of them can generate UV light. The electrical pump time-resolved spectrum studies provide a convenient tool to investigate the recombination process in the GaN material system. The results show that the UV emissions from bulk GaN and bulk InGaN materials, and the blue as well as the green emissions from the high efficiency InGaN SQW LEDs, correspond to bandedge transitions

L13 ANSWER 153 OF 156 INSPEC (C) 2006 IET on STN
 ACCESSION NUMBER: 1997:5479968 INSPEC
 DOCUMENT NUMBER: A1997-05-4260B-004; B1997-03-4320J-014
 TITLE: Spontaneous emission from a quantum-well GaN /InGaN/AlGaIn heterostructure at high pump currents
 AUTHOR: Akimova, I.V.; Eliseev, P.G.; (P.N. Lebedev Phys. Inst., Acad. of Sci., Moscow, Russia), Osinskii, M.A.; Perlin, P.
 SOURCE: Quantum Electronics (Dec. 1996), vol.26, no.12, p. 1039-41, 10 refs.
 CODEN: QUELEZ, ISSN: 1063-7818
 SICI: 1063-7818(199612)26:12L:1039:SEFQ;1-T
 Translation of: Kvantovaya Elektronika, Moskva (Dec. 1996), vol.23, no.12, p. 1069-71
 CODEN: KVEKA3, ISSN: 0368-7147
 SICI: 0368-7147(199612)23:12L:1069;1-D
 Published by: Turpion Ltd.; Kvantovaya Elektronika, UK
 DOCUMENT TYPE: Journal; Translation Abstracted
 TREATMENT CODE: Experimental
 COUNTRY: United Kingdom; Russian Federation
 LANGUAGE: English
 AN 1997:5479968 INSPEC DN A1997-05-4260B-004; B1997-03-4320J-014
 AB An investigation was made of the electroluminescence spectra of a structure with an InxGal-xN (3 nm thick) quantum well pumped by current pulses of up to 4 kA cm⁻² density at T=77 K and 300 K. Considerable spectral broadening ($\Delta E=150-200 \text{ meV}$) of nonthermal nature was

observed. A preliminary study was made of the stability of this light-emitting structure pumped by high-current pump pulses

L13 ANSWER 154 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1997:5472893 INSPEC
DOCUMENT NUMBER: A1997-04-4255P-014; B1997-02-4320J-091
TITLE: Light emission properties of GaN-based double heterostructures and quantum wells
AUTHOR: Loeber, D.A.S.; (Dept. of Electr. & Comput. Eng., Massachusetts Univ., Amherst, MA, USA), Redwing, J.M.; Anderson, N.G.; Tischler, M.A.
SOURCE: Gallium Nitride and Related Materials. First International Symposium, 1996, p. 949-54 of xxi+970 pp., 12 refs.
Editor(s): Ponce, F.A.; Dupuis, R.D.; Nakamura, S.; Edmond, J.A.
Published by: Mater. Res. Soc, Pittsburgh, PA, USA
Conference: Gallium Nitride and Related Materials. First International Symposium, Boston, MA, USA, 27 Nov.-1 Dec. 1995
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental
COUNTRY: United States
LANGUAGE: English

AN 1997:5472893 INSPEC DN A1997-04-4255P-014; B1997-02-4320J-091
AB Edge emission characteristics of optically pumped GaN-AlGaIn double heterostructures and quantum wells are examined. The samples, which were grown by metalorganic vapor phase epitaxy, are photoexcited with light from a pulsed nitrogen laser. The pump light is focused to a narrow stripe on the sample surface, oriented perpendicular to a cleaved edge, and the edge luminescence is collected and analyzed. We first compare emission characteristics of highly excited GaN-AlGaIn double heterostructures grown simultaneously on SiC and sapphire substrates. Polarization resolved spectral properties of edge luminescence from both structures is studied as a function of pump intensity and excitation stripe length. Characteristics indicative of stimulated emission are observed, particularly in the sample grown on SiC. We then present results demonstrating laser emission from a GaN-AlGaIn separate-confinement quantum-well heterostructure. At high pump intensities, band edge emission from the quantum well exhibits five narrow (1 Å) modes which are evenly spaced by 10 Å to within the resolution of the spectrometer. This represents the first demonstration of laser action in a GaN-based quantum-well structure

L13 ANSWER 155 OF 156 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1997:5472888 INSPEC
DOCUMENT NUMBER: A1997-04-4255P-012; B1997-02-4320J-089
TITLE: Optically pumped GaN-AlGaIn double-heterostructure lasers grown by ECR-GSMBE and HVPE
AUTHOR: Maki, P.A.; Molnar, R.J.; Aggarwal, R.L.; Liau, Z.-L.; Melngailis, I. (Lincoln Lab., MIT, Lexington, MA, USA)
SOURCE: Gallium Nitride and Related Materials. First International Symposium, 1996, p. 919-24 of xxi+970 pp., 12 refs.
Editor(s): Ponce, F.A.; Dupuis, R.D.; Nakamura, S.; Edmond, J.A.
Published by: Mater. Res. Soc, Pittsburgh, PA, USA
Conference: Gallium Nitride and Related Materials. First International Symposium, Boston, MA, USA, 27 Nov.-1 Dec. 1995
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Experimental

COUNTRY: United States

LANGUAGE: English

AN 1997:5472888 INSPEC DN A1997-04-4255P-012; B1997-02-4320J-089

AB GaN-Al_{0.1}Ga_{0.9}N double-heterostructure (DH) lasers. The laser structures were grown using an electron-cyclotron-resonance nitrogen-discharge source and gas-source molecular beam epitaxy (ECR-GSMBE) on thick ($\geq 10 \mu\text{m}$) GaN buffers grown by hydride vapor-phase epitaxy (HVPE) on c-plane sapphire. Transversely pumped cavities using a 337.1 nm nitrogen laser pump source exhibit a threshold pump fluence ranging from 0.15 to 0.3 mJ/cm² at 77 K, a linear light output above threshold, a lasing wavelength of 358 nm, and an estimated differential quantum efficiency of 1%. The room-temperature threshold is about 1.7 times higher. Longitudinal mode structure has been resolved in a shorter-cavity (23 μm) device at 77 K. The measured mode spacing of 0.56 nm corresponds to a group index of 5.0. Far-field measurements in a plane perpendicular to the plane of the heterostructure indicate a double-lobed pattern for a 1000 Å thick GaN active region, and a single lobe with a FWHM of 60° for a 4000 Å active region. The thick HVPE GaN buffer layer provides for a lattice-matched growth and results in improved nucleation in MBE, as indicated by a high-quality reflection-electron-diffraction pattern of the as-loaded wafers. The surface morphology of the MBE layers on the HVPE buffer shows improved optical smoothness as compared to layers grown directly on sapphire using a low-temperature, MBE-grown GaN buffer. Laser facets were formed either by saw cutting or cleaving of the GaN buffer and epilayer along crystal planes. Details of the material development and laser performance are described

L13 ANSWER 156 OF 156 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 1996:5433791 INSPEC

DOCUMENT NUMBER: A1997-01-7845-001; B1997-01-4220-003

TITLE: Observation of room temperature surface-emitting stimulated emission from GaN:Ge by optical pumping
AUTHOR: Zhang, X.; Kung, P.; Saxler, A.; Walker, D.; Razeghib, M. (Center for Quantum Devices, Northwestern Univ., Evanston, IL, USA)

SOURCE: Journal of Applied Physics (1 Dec. 1996), vol.80, no.11, p. 6544-6, 25 refs.

CODEN: JAPIAU, ISSN: 0021-8979

SICI: 0021-8979(19961201)80:11L:6544:ORTS;1-S

Price: 0021-8979/96/80(11)6544(3)\$10.00

Doc.No.: S0021-8979(96)06723-0

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

COUNTRY: United States

LANGUAGE: English

AN 1996:5433791 INSPEC DN A1997-01-7845-001; B1997-01-4220-003

AB Optically pumped surface-emitting stimulated emission at room temperature was observed from GaN:Ge grown by metalorganic chemical vapor deposition. The sample was optically pumped perpendicularly on the top surface while the stimulated emission was collected from the back colinearly with the pump beam. The cavity was formed by the GaN/air and GaN/sapphire interfaces without any other structure. The stimulated emission was gain guided by the pump beam. The threshold optical pump density for stimulated emission was approximately 2.8 MW/cm² and the linewidth was 2.5 nm. The emission from GaN:Ge showed a redshift as the pump density increased. The comparison between theoretical calculations and experimental results suggested that many-body interactions can account well for the redshift